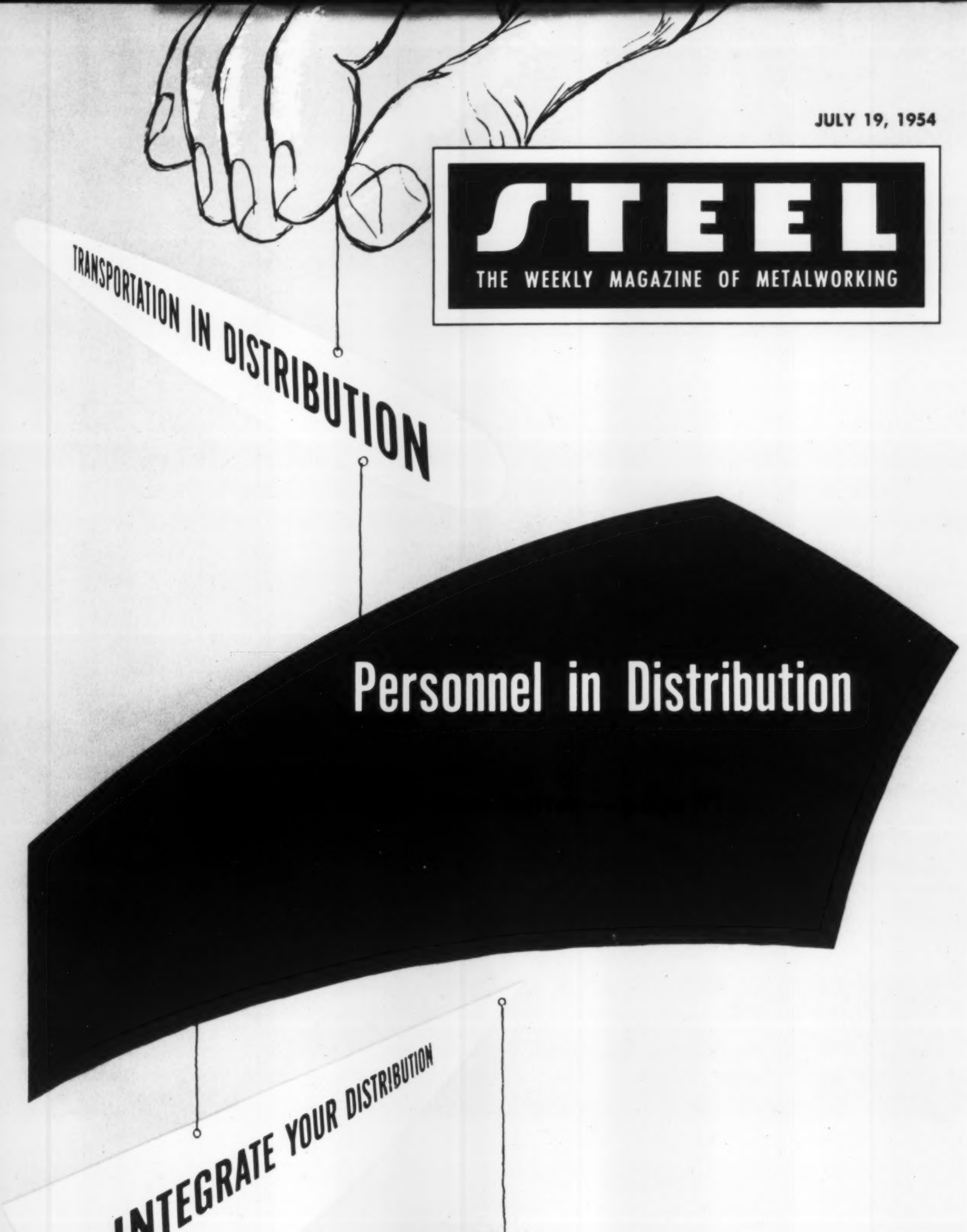
JULY 19, 1954

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



TRANSPORTATION IN DISTRIBUTION

Personnel in Distribution

INTEGRATE YOUR DISTRIBUTION

A PROGRAM FOR MANAGEMENT IN 1954

No. 6 in 1954 Management Series

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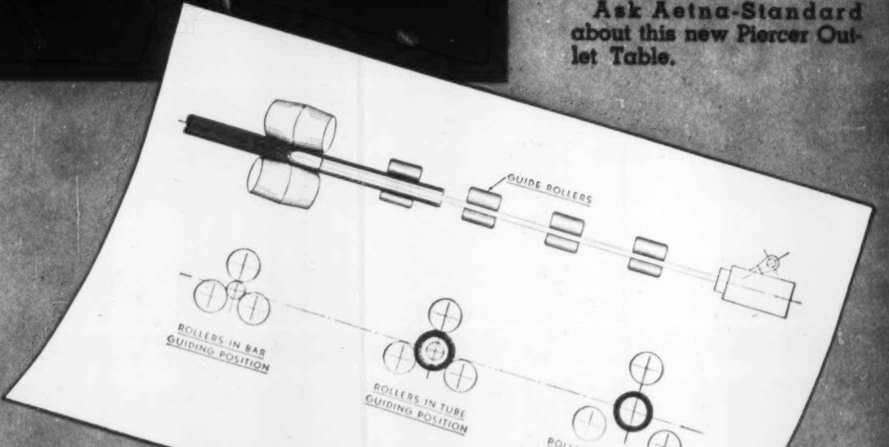
New Piercer Outlet Table

improves concentricity of tubes

The same rollers guide both piercer bar and tube, assuring three advantages: (1) positive guiding of bar; (2) improved outside tube surface; (3) more uniform concentricity from end to end of tube.

On the operating side, the setting for different rolling schedules (changes in bar or tube diameter) requires only a few minutes . . . without crane service.

Ask Aetna-Standard about this new Piercer Outlet Table.



GUIDE ROLLERS
ROLLERS IN BAR GUIDING POSITION
ROLLERS IN TUBE GUIDING POSITION
ROLLERS IN OUT POSITION FOR TUBE TO BE KICKED OUT

features

1. Same rollers guide piercer bar and tube (see diagram).
2. Guide rollers open automatically from bar guiding to tube guiding position as pierced tube leaves piercing mill.
3. Indicators allow quick setting of guide rollers to suit respective mandrel bar and O. D. tube sizes.
4. Roller guides are adjustable for full range of piercing mill from minimum diameter bar to maximum O. D. tube.
5. Simple, rugged design.

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

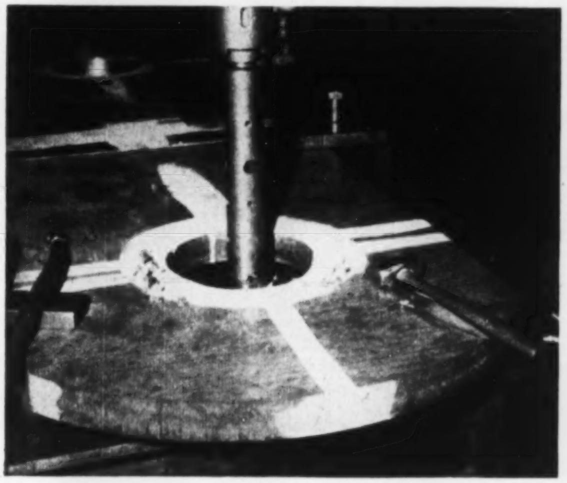
GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

SUBSIDIARY and ASSOCIATED COMPANIES

Head Wrightson Machine Company, Ltd., Middlesbrough, England—Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.
Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.
M. Castellvi, Inc., New York, N. Y. — Mexico, Central and South America.
Societe de Constructions de Montbard, Paris, France — France, Belgium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.
Hale & Kullgren, Inc., Akron, Ohio — Representative for the Rubber Industry.
Standard Engineering Company, Ellwood City, Pa.
Trans-World Traders, Pittsburgh, Pa.

Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industries

Burning the pin holes. Flame-cutting was also used to round the ends.



Boring the pin holes to finished size for 12-in. diameter hanger pins.

Planing the surface of the hanger to conform to angle formed between two connecting girders.

Bridge hanger-links show workability of this high-strength, low-alloy steel

The eight hanger-links for the Passaic River Bridge, on the New Jersey Turnpike, provide an excellent demonstration of the workability of high-strength, low-alloy Mayari R. Located at each end of the 990-ft continuous girder—longest ever built in this country—these hangers connect the bridge to the approach spans.

The hangers were fabricated of 3-in. Mayari R plate at Bethlehem's Pottstown, Pa., works. Flame-cutting was used to round off the ends. Holes for the 12-in. hanger pins were also cut by burning. They were then bored to exact diameter.

Planing came into the picture, too. Because of a slight curvature in the bridge, the adjoining girders came together at an angle of 1 deg, 5 min, 14 sec, which of course meant that the hanger pins had to be out of parallel. This made it necessary to plane the hangers in such a way that both the upper and lower portions would bear evenly against the respective girders.

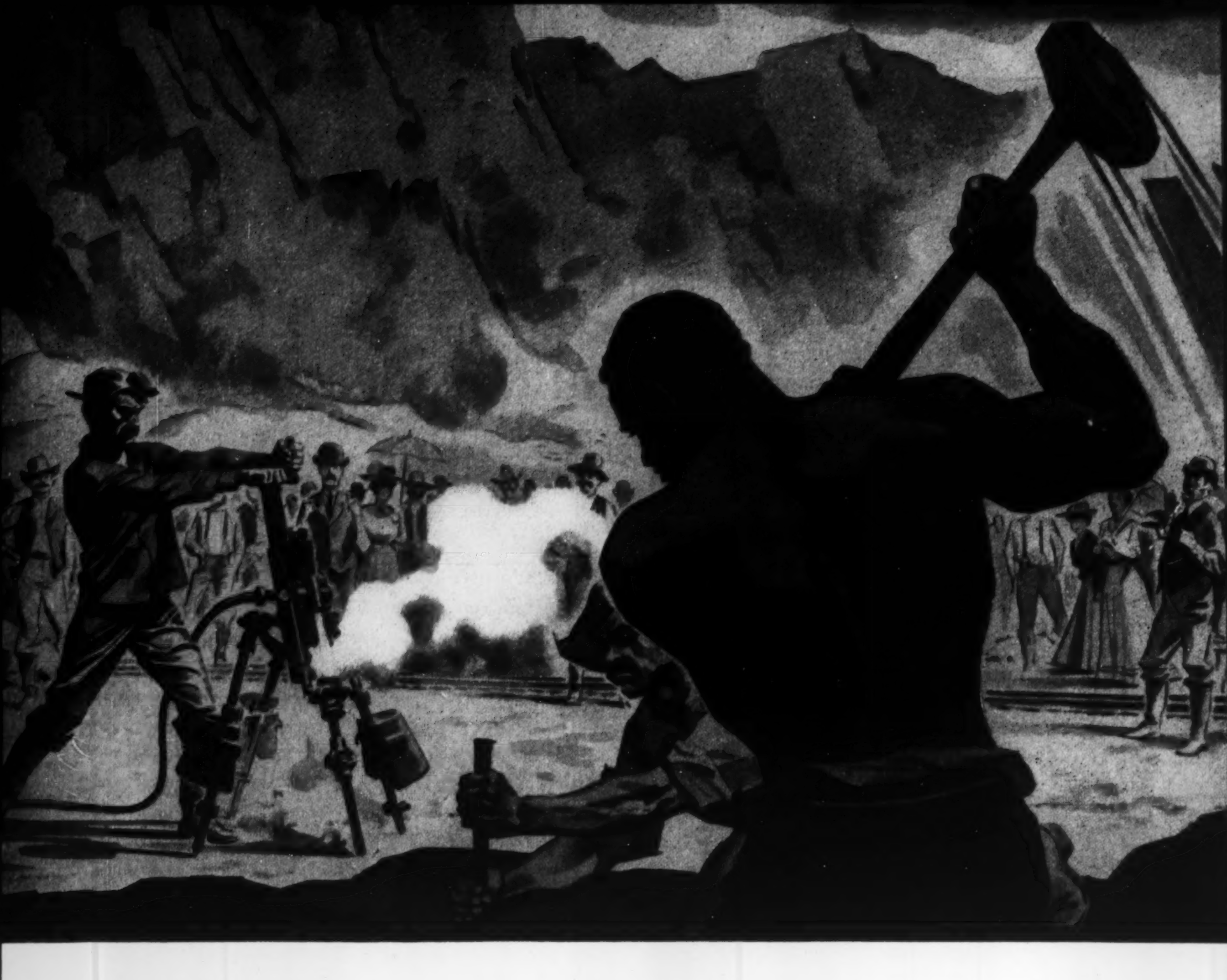
All these operations were accomplished as readily with Mayari R as they would have been with structural carbon steel. And Mayari R can be worked easily in other ways, too—riveting, cold forming, hot forming, shearing, punching. Its use is spreading rapidly, as you will discover if you leaf through our new Catalog 353. Write or call our nearest office for a copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R *makes it lighter... stronger... longer lasting*



Machine vs. muscle — a duel to the death!

COMPETITION was *mighty* rough on the great Jawn Henry, famed steel-driving rock driller of the last century. For he pitted his strength against a steam-driven drill and *won*—only to die, hours later, from the strain. And the steam drill (later converted to air) replaced all hand methods of drilling rock.

The old order changes, yielding place to new and better ways of doing things. For competition and progress go hand in hand.

In today's highly competitive market, it's important that improved production methods be utilized to the fullest possible extent. That's where we can help. For Heald offers a potent combination of fresh thinking and sound experience in every phase of precision finishing. New developments in automation, way-type and transfer Bore-Matics, interchangeable tooling and improved internal grinding methods are just a few of the ways in which Heald may be able to solve your specific problems.

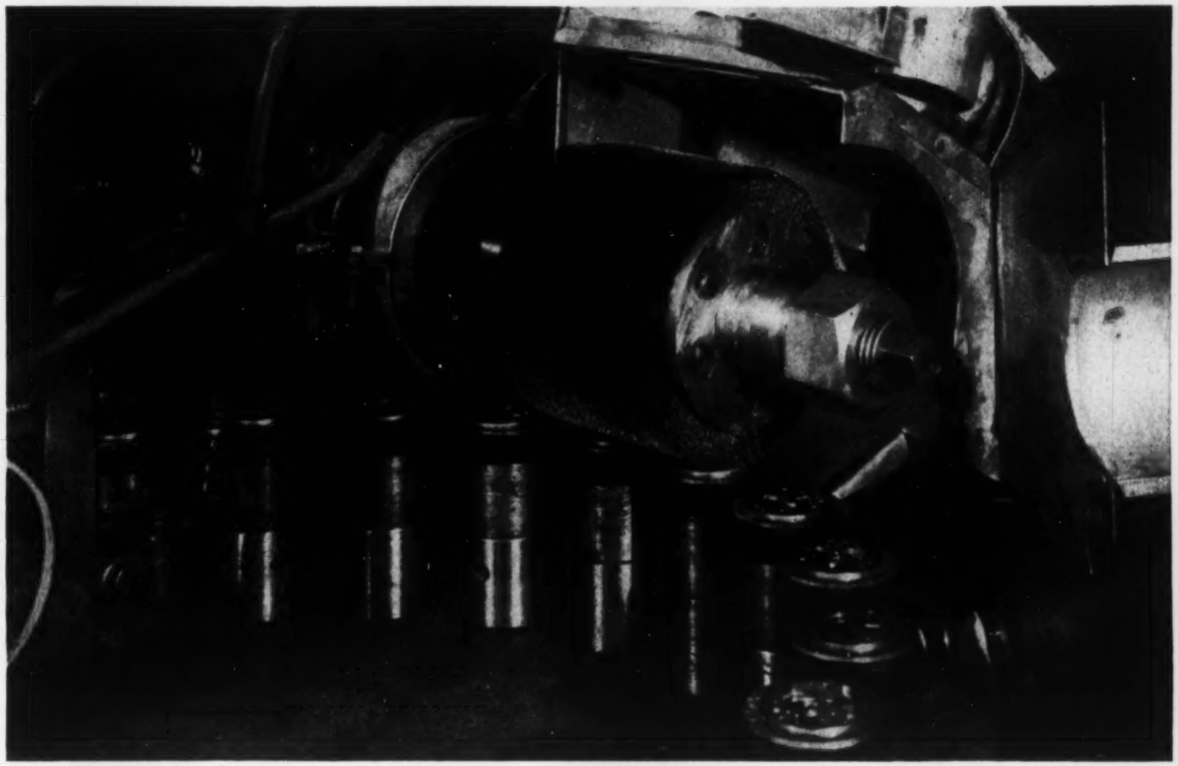
Competition is wonderful when you're *ahead* of it. Our business is to keep you there. That's why IT PAYS TO COME TO HEALD.

Internal and Rotary Surface Grinding Machines

HEALD

Bore-Matics

THE HEALD MACHINE COMPANY
WORCESTER 6, MASSACHUSETTS
Offices in Chicago • Cleveland • Dayton
Detroit • Indianapolis • New York



How to brush down finishing costs *automatically*

Power Brushing finishes both sides of these brass discs at a rate of 15,000 per machine per eight-hour day. It does a better, more uniform job many times faster than hand methods.

Parts are placed on spindles which rotate at 60 r.p.m. The table also turns at about one revolution in 25 seconds bringing the Osborn Economy® Section Brushes into contact with each part in turn. Spindles stop rotating as they approach the loading station, where a mechanism lifts finished parts and air pressure blows them into a chute.

A similar automatic operation with Osborn Power Brushing may improve the quality and speed of *your* cleaning, finishing and deburring operations . . . whether you process large parts or small . . . made of metallic or non-metallic materials. Ask your nearby **O**sborn **B**rushing **A**nalyst to appraise *your* possibilities. Write to *The Osborn Manufacturing Company, Dept. G-21, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

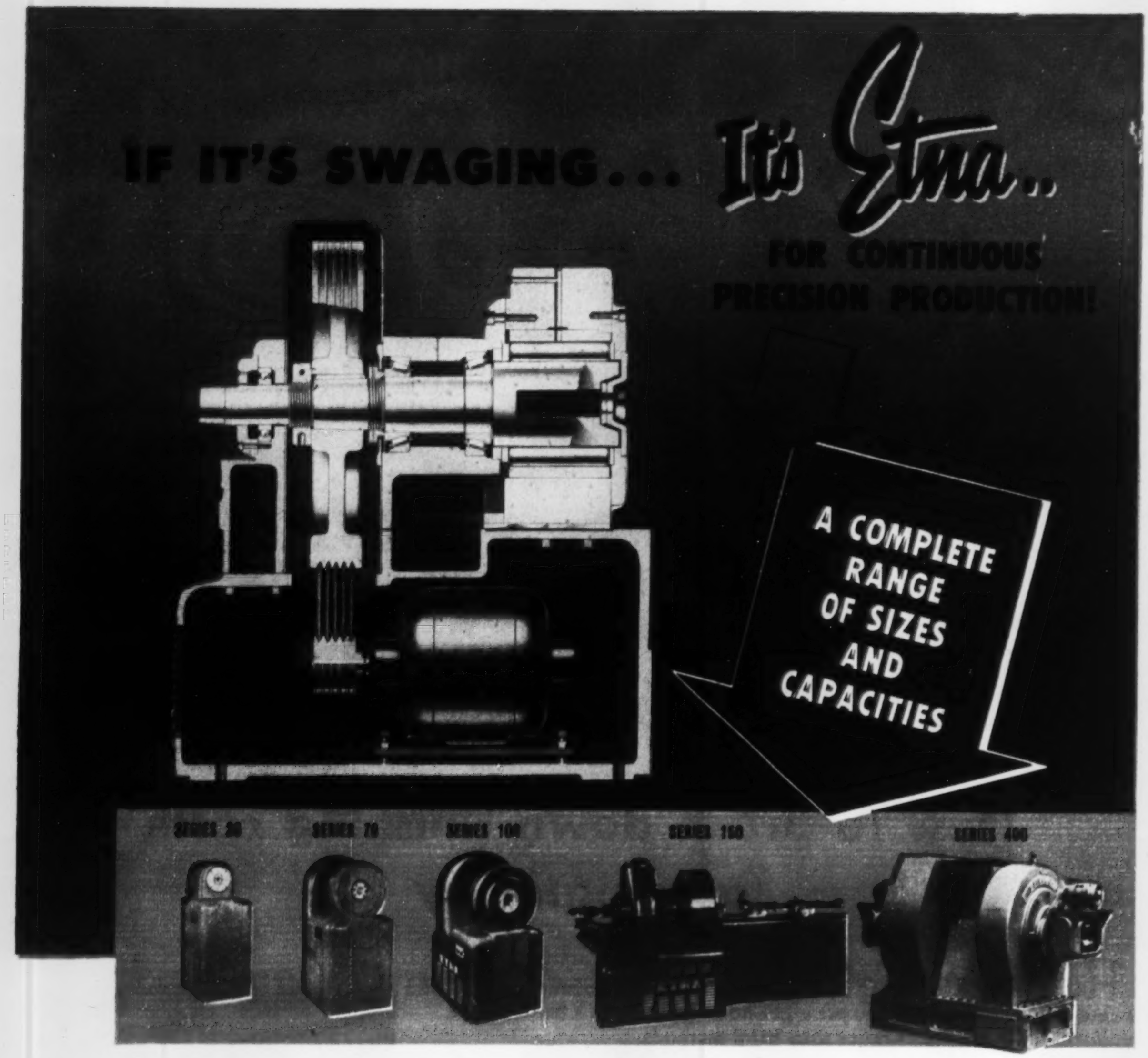
FREE: New booklet on deburring with Osborn Power Brushing. Ask for your copy.

The finished part. Osborn Power Brushing removes feather burrs and blends surface junctures.

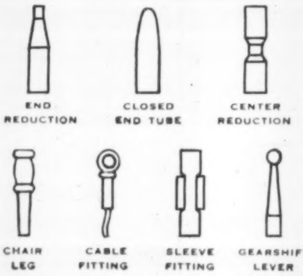
Osborn Brushes

OSBORN

OSBORN BRUSHING METHODS • POWER, MAINTENANCE AND PAINT BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES


IF IT'S SWAGING... It's Etna..
FOR CONTINUOUS PRECISION PRODUCTION!
A COMPLETE RANGE OF SIZES AND CAPACITIES
SERIES 20
SERIES 70
SERIES 100
SERIES 150
SERIES 400

For tapering, sizing, reducing and forming to special shapes of round solids and steel tubing, the Etna Swaging Machine offers the ultimate in modern machine design. Regardless of size and description of the job to be done, there's an Etna swager right for *greater production*. Write today regarding your specific job problems.


END REDUCTION
CLOSED END TUBE
CENTER REDUCTION
CHAIR LEG
CABLE FITTING
SLEEVE FITTING
GEARSHIFT LEVER

It's New! Get full information on the blending into the wall of I. D. Bead on steel and stainless steel tube with Etna Swagers resulting in mirror finish. Bead also removed on conduit.

Abbey ETNA Company

3402 MAPLEWOOD AVE., TOLEDO 10, OHIO

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 135 No. 3 July 19, 1954

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Editorial, Business Staffs—16. Advertising Index—181. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

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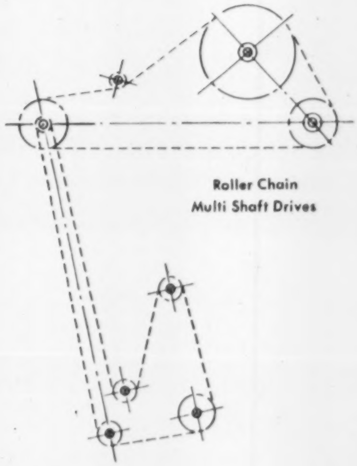
ACME CHAIN

Roller Chain
ENGINEERING SERVICE
'Yours'
FOR THE ASKING

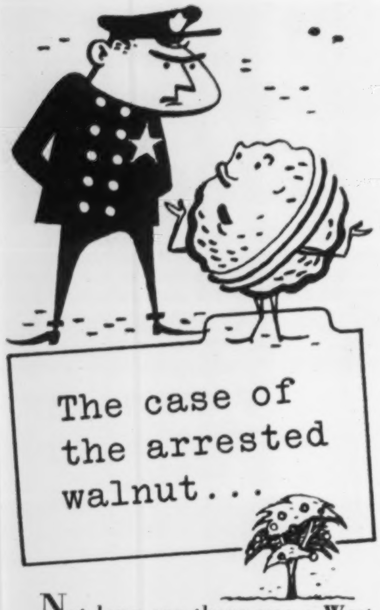


Acme engineers will gladly work shoulder to shoulder with your designers to plan the details of sprocket, ratio, chain impact, tension, drive speed and other factors necessary to obtain the maximum efficiency and economy on your project.

WRITE OR PHONE HOLYOKE 2-9458

Write
Dept. 10-K for new illustrated 76 page catalog on use and application of roller chains and sprockets.

Acme Chain Corporation
HOLYOKE
MASSACHUSETTS


The case of the arrested walnut. . .

Not long ago there was a West Coast walnut grower faced with the problem of shaking a lot of arrested walnuts out of a lot of walnut trees.

With a note of perplexity in his voice, he asked us what to do, and we went to work with a CLEVELAND vibrator.

It gave those walnut trees a bad time . . . kept those walnuts moving like tomorrow's neighbor . . . and left the walnut grower beaming happily.

What's the problem in your case? Just tell us . . . or ask for our detailed literature.

AIR *and* ELECTRIC

Bin Stuck Lately?
CLEVELAND

THE
CLEVELAND
VIBRATOR
COMPANY

2780 Clinton Ave. • Cleveland 13, Ohio

behind the scenes

Witches' Which

Newman Ladabouche, STEEL's market research expert, has been hopscotching the country addressing groups of metalworking men on the subject "Metalworking Markets in the United States."

Along with many interesting stories about how management is focusing attention on the subject of distribution and sales, Ladabouche brought back this tid-bit from Boston this week.

It seems that taint's good business in Salem — the taint of witchcraft, that is.

With tourist's dollars in mind, apparently, the Bay State legislators have just killed a measure that would have removed the stain of guilt from those hanged as witches in the old town back in 1692.

The witful lawmakers concluded that a witchless Salem wouldn't stand a ghost of a chance with the tourists.

Besides, the Commonwealth of that time confiscated the hangees property. And to give it back to the rightful owners today would take a lot of figuring—which real estate was witches', and which wasn't.

"At any rate", says Lad, "the grave issue of the past has been settled for the present."

Dear Georgi Malenkov:

We were reading a recent issue of a pamphlet issued by the Wolf Envelope Co. of Cleveland called "Letters." In it was quoted this literary gem written by Harry and David, operators of the Fruit-of-the-Month Club.

Mr. Georgi Malenkov
c/o The Kremlin
Moscow, Russia

Here,
Georgi,
are some preserves for you. We want you to taste them 'cause they're the finest made.

Millionaires can't buy anything finer!

That's right, Georgi, *these are capitalistic preserves!* We ship 'em to folks who work in Wall Street, who have estates on Long Island, who are members of our Fruit-of-the-Month Club.

But you know who else belongs to our Fruit-of-the-Month Club? We've got news for you!

Harry and I send *these same capitalistic preserves* to automobile workers in Detroit, farmers in Kansas, miners in Pennsylvania, cab drivers, school teachers, railroad men, preachers, priests, rabbis, store owners and office clerks . . to folks in every walk of life.

That's America for you! Over here, people rub elbows in more ways than you imagine. Over here, they *share* the best there is . . . including freedom! Not only have Americans the *right* to rub elbows and share things, but they can *afford* it!

Take these preserves of ours, for instance—something you couldn't buy in Russia for a silo full of rubles! Got any idea what they cost in America? Well—this is going to kill you.

These capitalistic preserves (all five varieties) cost less than half a dozen shriveled-up Moscow potatoes, less than three cups of flour in Stalingrad. And you know how tough it is to get potatoes or flour in either place.

That's the way it is, Georgi. Call it capitalism or call it by its right name —*freedom*, it adds up to a way of life that doesn't call for secret police, slave labor and starvation.

Here's some preserves for you . . . a taste of what freedom means!

Harry and David

Good going, men. Hope you were subtle enough to send him raspberry!

Fore!

News Flash! The emaciated eight met with booming brassies and pulsating putters on Spring Valley's luscious links last Saturday morning.

Campbell, Zimmerman, Huber, Jaynes, Love, Dean, Morrissey, and Shrdlu pounded the bejassus out of golf balls and turf alike. When last seen, the eleemosynary eight were matching bingoes, bangoes and bungoes. More about this when Shrdlu has had an opportunity to run a few statistical correlations on the score cards.

Shrdlu

(Metalworking Outlook—Page 43)

BARIUM
FORGINGS
MACHINING
SPRINGS
STAMPINGS

Get FOUR basics from a single source on the double

If you're one of the thousands of manufacturers who use forgings, stampings, springs or machinings, here's a tip:

Barium is one of the few organizations (frankly, we can't think of another) that gives you the opportunity to buy *any or all* of these basics from just *one source*. By the piece or assembled, whichever way you need them. We can do this because we've got *separate companies* devoting their time and talent to each of these operations — not just divisions or departments.

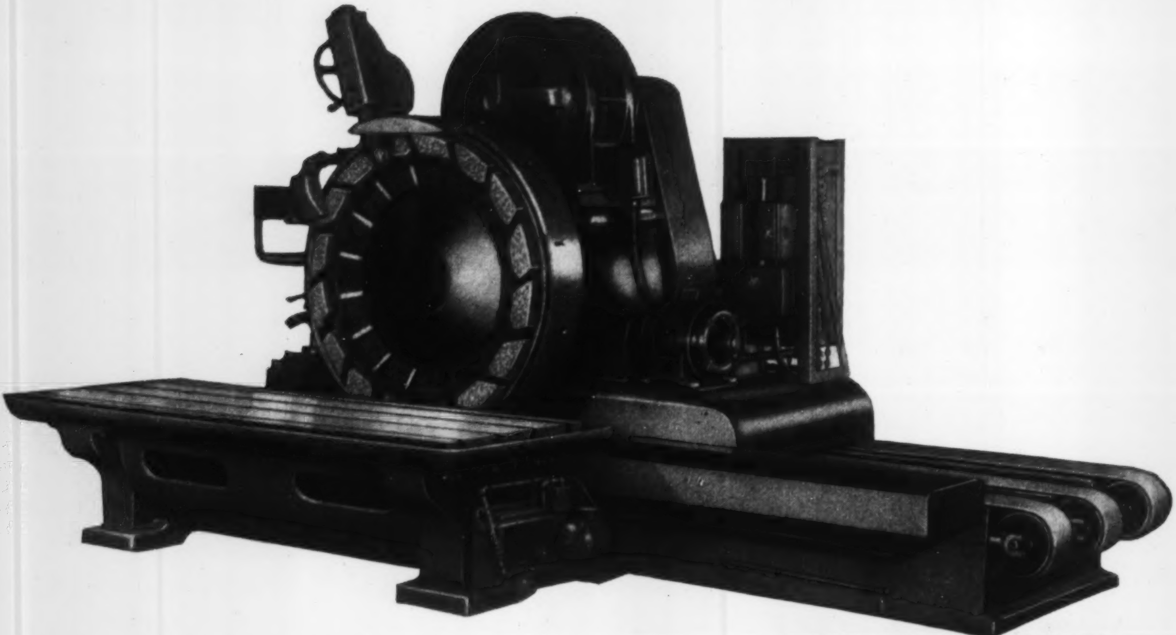
We don't stop there. If you like, your product can receive the free benefit of Barium's "focused engineering". This unique service concentrates on your problem some of the most advanced engineering thinking being done today in an unequalled variety of fields. Whether you need a bridge girder or an airplane engine, Barium's the place to come for it. That's why dealing with Barium takes a load off your shoulders as well as your desk.

Remember — to Barium your *entire* order is important. No danger of any component being delayed — Barium keeps sharp watch on all processing. This means faster handling, less paperwork, and pinpointed responsibility. Write for "The Barium Story" — it tells all. BARIUM STEEL CORPORATION, 25 Broad St., New York City 4.

16
INTEGRATED COMPANIES
BARIUM
STEEL CORPORATION
WORKING IN STEEL, ALUMINUM, MAGNESIUM, FIBERGLASS

4.1

BAYONNE BOLT CORP. • CENTRAL IRON AND STEEL COMPANY • CHESTER BLAST FURNACE • CLYDE IRON WORKS, INC. CUYAHOGA SPRING COMPANY • EAST COAST AERONAUTICS, INC. • ERIE BOLT AND NUT COMPANY • GEOMETRIC STAMPING CO. GLOBE FORGE, INCORPORATED • INDUSTRIAL FORGE & STEEL, INC. • JACOBS AIRCRAFT ENGINE CO. • KERMATH MANUFACTURING CO. • KERMATH LIMITED (CANADA) • PHOENIX BRIDGE CO. • PHOENIX IRON & STEEL CO. • WILEY MANUFACTURING CO.



MATTISON TRAVELING WHEEL GRINDER FOR FAST FINISHING OF LONG OR LARGE PARTS

If your work consists of long or bulky parts, Mattison UK Traveling Wheel Grinders will finish them at a surprising rate of speed and accuracy and at very low cost. Large and awkward shaped pieces are frequently ground in a good deal less time than previous method. The part, no matter how large, is clamped in a stationary position and the grinding wheel passes across the surface to be finished. Amount of floor space needed is little more than half that required by traveling table machines of equal capacity. The operator's position on the carriage, together with the convenient grouping of all controls, makes for utmost grinding accuracy and speed regardless of the size of the job.

For further information, send for new free circular No. 844-2 RM covering this machine.

The operator rides the carriage of the UK Traveling Wheel Grinder. From this position he gets a safe unobstructed view of the grinding wheel at point of contact and can observe the work at all times.

Heavy work of practically any length can be rapidly ground to close tolerances with no more power required than for lighter work — the UK's table is always stationary. Picture shows end of 35' base being ground.

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Warplis

Excellent

FOR TOOLS AND DIES AND PRECISION PARTS

400 Stock Sizes
ROUNDS—Warplis Drill Rods
FLATS and SQUARES—Warplis Flat Stock

. . . oil hardening, *non-warping*, electric furnace tool steel . . . from husky die sections to ribbon-like flats and delicate rounds and squares . . . *precision* ground, true to size and section; decarb-free.

From fine steel distributors coast to coast. Descriptive price folders on request.

Analysis:
C. .90 Mn. 1.10
Cr. .50 Tung. .50
Vanadium .15

Air hardening tool steel of the 5% chromium type is available in flats and squares, precision ground, for long-run or out-of-the-ordinary applications.

PITTSBURGH TOOL STEEL WIRE CO. • MONACA, PA.

Since 1902 . . . makers of cold finished fine steels in all sizes, grades and shapes

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KEYSTONE
"Special Processed"
COLD HEADING WIRE

The superior performance of Keystone "Special Processed" Wire on difficult cold heading jobs is recognized by licensed manufacturers of recessed head screws throughout the country.

The excellent flow properties of this wire assures uniform, strength-giving grain structure which "trademarks" high quality production. The structural soundness and uniformity of "Special Processed" wire is the result of careful selection of raw materials, our own exclusive drawing and heat treating process, rigid quality controls and inspections.

Keystone is doubling its production capacity on "Special Processed" Cold Heading Wire to keep pace with the ever increasing demand of old and new customers alike. Your inquiry is welcomed.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

LETTERS
TO THE EDITORS

Comment in Refreshing Style

Re: Mirrors of Motordom (June 28, p. 69).
Your manner of reporting the
Chrysler Extravaganza refreshing
Held my attention (even tho an Olds fan)
One needs to get new trends in thot,
And you styled one for this issue.

R. H. Pope
Watertown, Conn.

Improving Business Statistics

Please extend my compliments to your Washington Editor, E. C. Kreutzberg, for his excellent handling of a difficult subject in his Windows of Washington column, "Business Statistics: Hoopla or Science?" (June 14, p. 74).

John W. Lehman
Joint Committee on the Economic Report
Congress of the U. S.
Washington

Quench Can Be Interrupted

Please send six tear sheets of the article, "Interrupted Quench Gives Special Properties" (June 21, p. 128), which is Part 3 of the series, "Fundamentals of Quenching."

Arne Nyen
Minneapolis-Moline Co.
Minneapolis

- *Sent.—ED.*

Handbook Gains Wide Audience

We would like to obtain three copies of STEEL's Specifications Handbook.

L. R. Webb
resident manager
Warehouse Division
Jones & Laughlin Steel Corp.
Nashville, Tenn.

This publication has a materials specification cross reference that I have long felt a need for in our work and had until now been unable to find. I am writing to ask how I may obtain three copies.

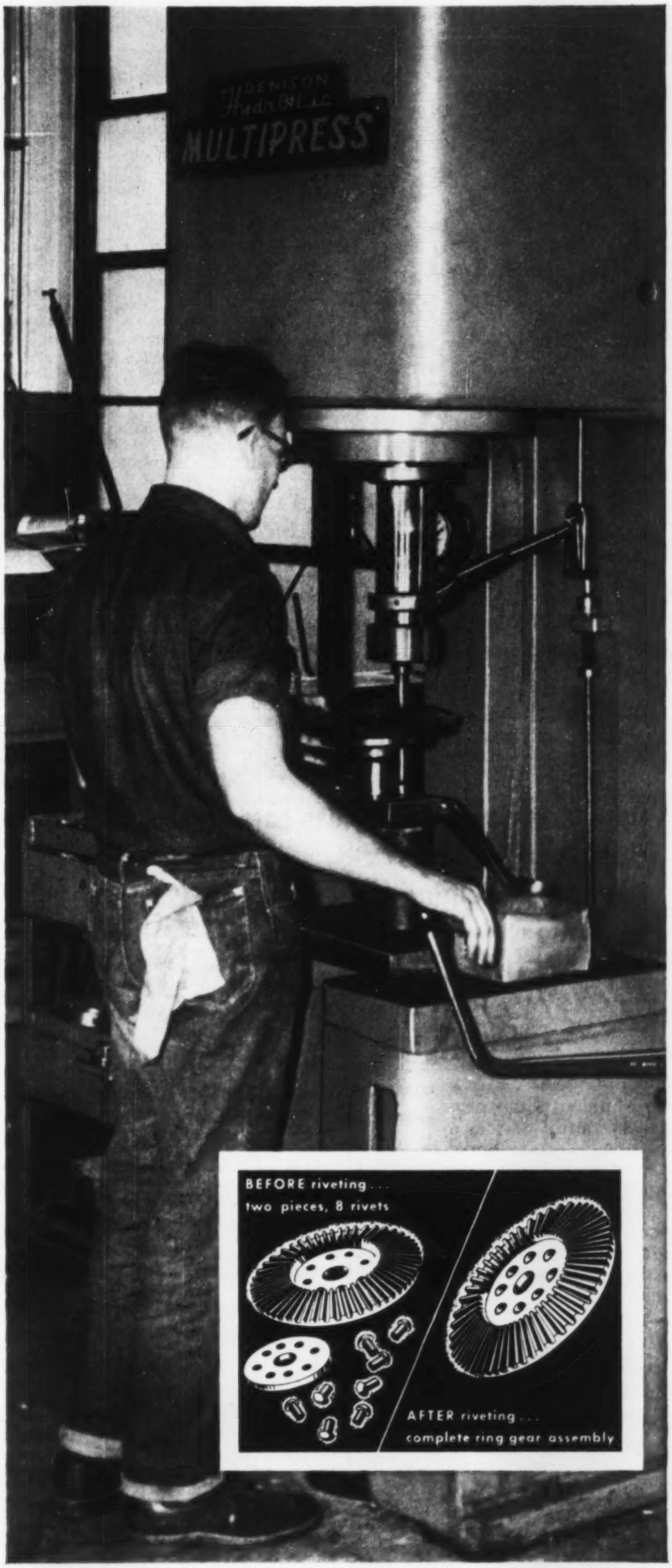
G. C. Sidwell, supervisor
Aircraft Gas Turbine Division
General Electric Co.
Cincinnati

Please send us a copy. We have need for such a manual in our department.

Loyal G. Brown
Purchasing Department
Dow Chemical Co.
Freeport, Tex.

. . . the detailed technical information pertaining to the chemistry and specifi-

(Please turn to page 12)


DENISON
HydrOILic
MULTIPRESS
BEFORE riveting . . .
two pieces, 8 rivets
AFTER riveting . . .
complete ring gear assembly

One man, one DENISON MULTIPRESS® . . . 9 times the production per man

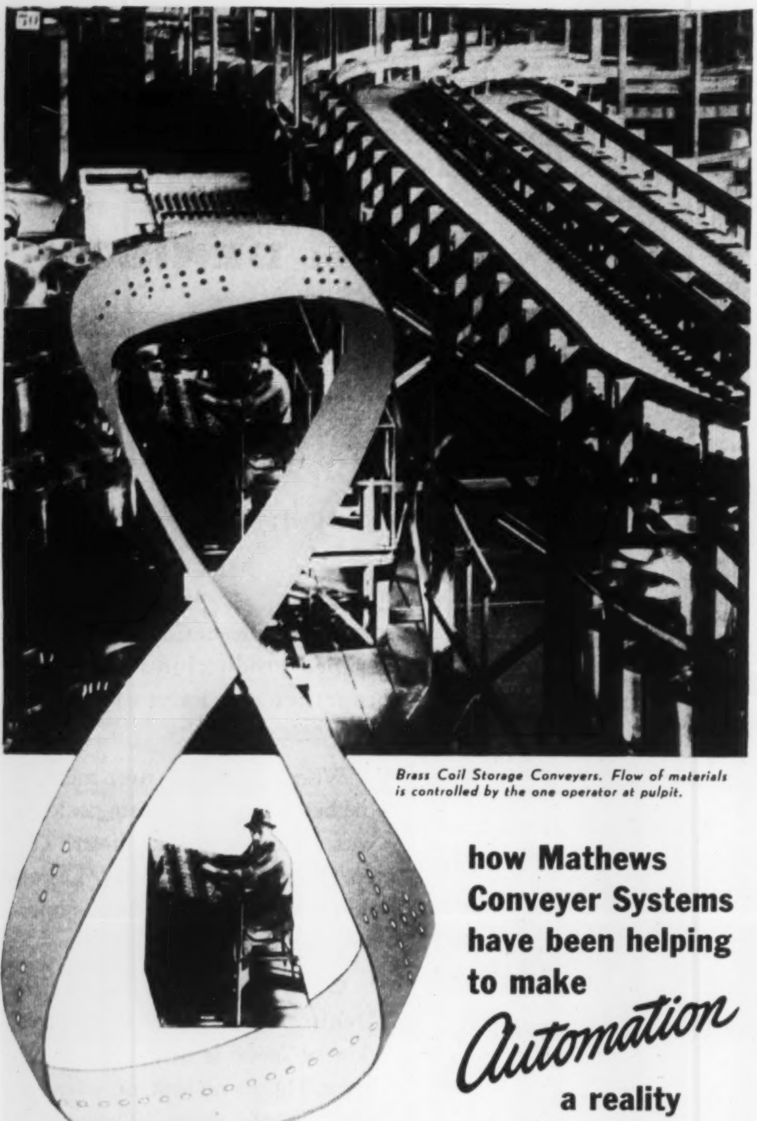
At Barber-Greene Company, they've tripled production for riveting together two halves of a ring gear assembly.

With former hot rivet method, the best a three-man team could do was 10 assemblies an hour. The operation was slow, noisy. Distortion from heat made a boring operation necessary.

With cold riveting, using Denison's hydraulic Multipress, flow of metal is better, more uniform. There's no heat, no warpage. One operator rivets 30 assemblies an hour.

You can get the same results. Send for bulletins and case studies on applications in the one to 75-ton pressure range. Write to: THE DENISON ENGINEERING COMPANY, 1163 Dublin Road, Columbus 16, Ohio.

DENISON
TRADE MARK HydrOILics



Brass Coil Storage Conveyers. Flow of materials is controlled by the one operator at pulpit.

how Mathews Conveyer Systems have been helping to make *Automation* a reality

● Mathews Conveyers, equipped with such control devices as electric eye mechanisms, traffic control units, special brakes and stops, and automatic deflectors, have for several years been helping manufacturers to progress toward automation by handling materials to processing machines and away with a minimum of manual effort. In almost every industry, in plants throughout the United States and Canada, you'll find Mathews Conveyer Systems at work helping to make AUTOMATION a reality. Write for informtaion to the Mathews Field Office or Plant nearest you.

MCC **MATHEWS CONVEYERS**

GENERAL OFFICES . . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA
PACIFIC COAST DIVISION . . . *Mathews Conveyer Company West Coast*
SAN CARLOS, CALIFORNIA
CANADIAN DIVISION . . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO
ENGINEERING OFFICES OR SALES AGENCIES IN PRINCIPAL AMERICAN AND CANADIAN CITIES

LETTERS

(Concluded from page 10)

cation numbers of ferrous and nonferrous metals is of great value and would be particularly valuable in many ways for my department.

L. F. Horne
Methods Department
Electronics Division
Ultrasonic Corp.
Cambridge, Mass.

Please send two copies . . .

Vince Underwood
Schwien Inc.
Van Nuys, Calif.

● *The supply of* STEEL'S *Specifications Handbook is completely exhausted and at present no plans have been made to further reprint it. You may still obtain a copy of these specifications from the Superintendent of Documents, Washington. The government pamphlet provides the same information as* STEEL'S *handbook except for certain aluminum producer information. A revised list of specifications will be completed shortly and when ready will also be available from the Superintendent of Documents.—ED.*

Leasing Blossoms Out

Your series of three articles on the pros and cons of leasing and renting (Mar. 29, Apr. 5 and Apr. 12) is very interesting. I had not realized that leasing of equipment had gone quite so far.

Walter W. Becky
Lamp Division
General Electric Co.
Cleveland

The Need for Apprentices

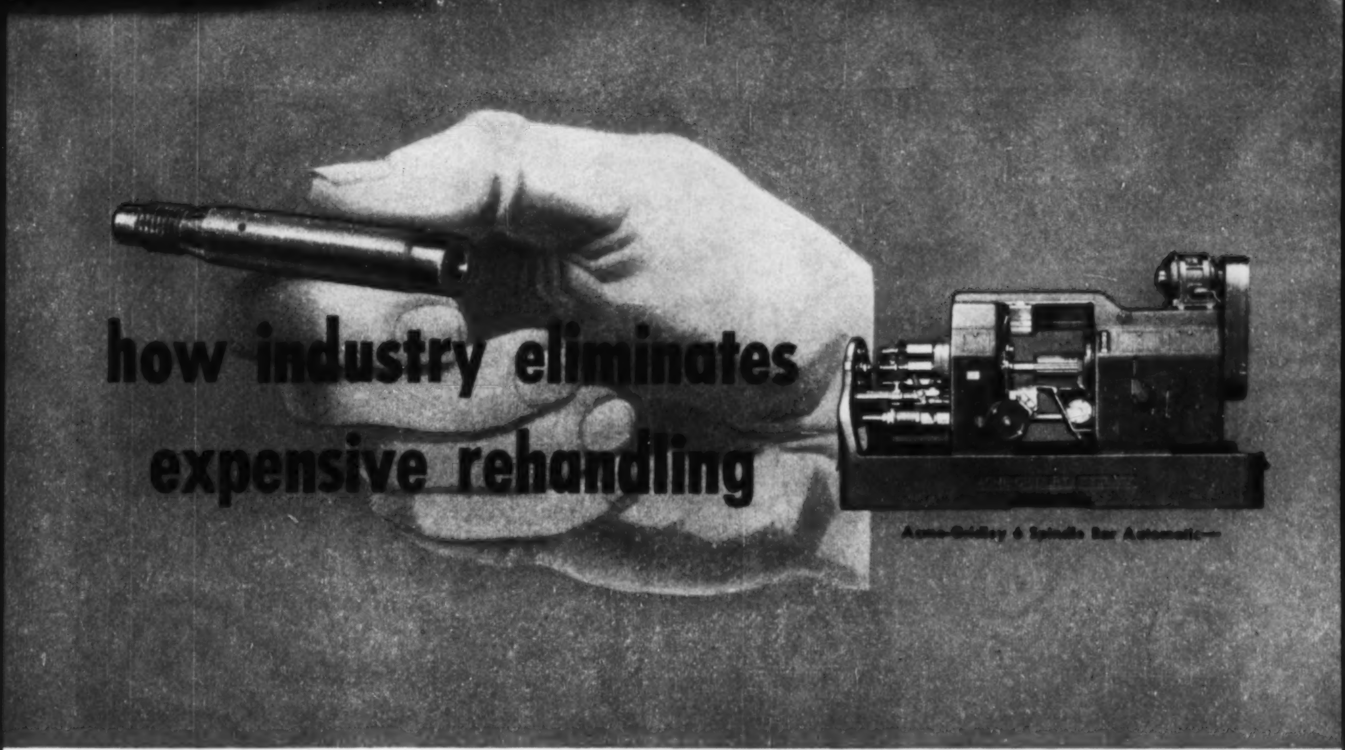
APPRENTICES WANTED

Your article, "Apprentices: Assurance of Skilled Labor Tomorrow" (May 3, p. 65), is very interesting and informative. Along with others who have been interested in apprentice training, I hope it will stimulate greater interest in and appreciation of such training.

I am interested also in the movie you mention on apprentice training that has been prepared by the National Tool & Die Manufacturers Association. I would like to arrange for the loan of a print for showing to some of our local groups.

E. S. Webster
chief, Training Branch
Watervliet Arsenal
Watervliet, N. Y.

● *Your request has been passed on to the National Tool & Die Manufacturers Association, 907 Public Square Bldg., Cleveland 13. The association will contact you directly. Incidentally, the movie you mention, "Tool & Die Making—Keystone of Mass Production," has had 450 showings to a combined audience of 40,000 persons during the first quarter, 1954.—ED.*



with ACME-GRIDLEY Bar Automatics

Whether you "automate" or pick 'em up with your fingers, you're going to have a certain amount of handling in making any product. But, the less *re*handling—the faster the job is done and the lower the cost per piece.

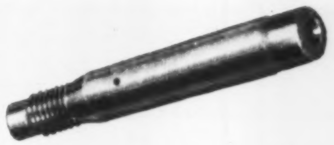
That is why more and more manufacturers are getting more operations on their primary machining equipment. It's also why, every day, more intricate parts like these—and larger ones, too—are being *completed in one setup* on multiple spindle Acme-Gridley bar machines.

Ingenious tooling of these versatile machines with standard National Acme toolholders and attachments often eliminates second operation work entirely—saves not only handling, but also extra machines, floor space and valuable man-hours. And in addition, the parts are more accurate because you don't have to re-chuck.

Check your machining methods today—then ask your engineers and ours to talk it over.

Remember—the biggest help to your competition is your continued use of obsolete equipment.

ON JOBS LIKE THESE



DRILLED STUD 3/8" diameter, 2 1/4" long.
MATERIAL: B-1113 CD Steel.
OPERATIONS: 12 including rolled thread and spindle stopper for cross drilling to blind hole.
MACHINE TIME: 9 seconds (400 completed pieces per hour.)
(Formerly done in two setups)

WORM 3/8" diameter, 1 3/4" long.
MATERIAL: B-1113 CD Steel.
OPERATIONS: 9 including machining the worm and broaching end of piece.
MACHINE TIME: 8 seconds (450 per hour.)
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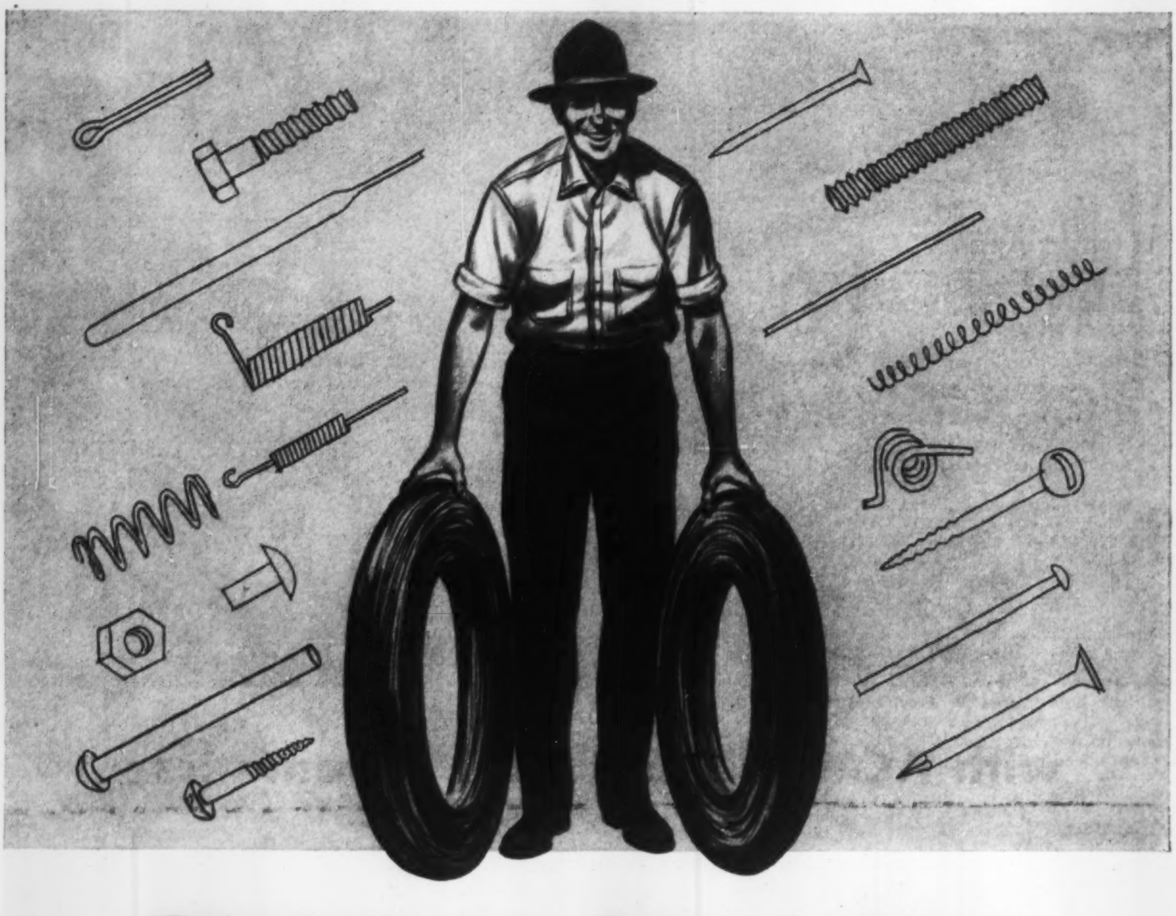

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W&D-5210 **Warehouse stocks carried by all Ryerson steel plants**

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One of our customers, who recently called to order his fourth Blanchard Surface Grinder, made us blush with pleasure.

"It's a shame," he said, "that every machine shop owner doesn't know as much about Blanchards as I know.

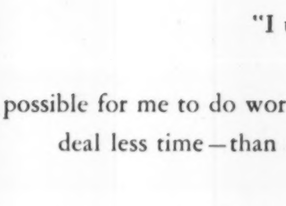
"I use 3 Blanchards almost around the clock in my contract machining business. They make it possible for me to do work much more economically—and in a great deal less time—than my customers can.

"For example, one of my customers had been grinding 1/8" of stock off both sides of 3" x 4" 4140 steel blocks, to a dimension tolerance of ± .0005". The fastest method in his shop involved turning the blocks in a chucking lathe and then grinding them in three operations on his grinder.

"We put the blocks, 17 per load, on a Blanchard and ground them to size . . . ***in exactly the same time that my customer needed to turn 5 blocks before grinding.***

"If you could tell every machine shop owner that story, you'd sell more grinders than you could build."

We're following his suggestion!



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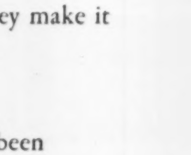

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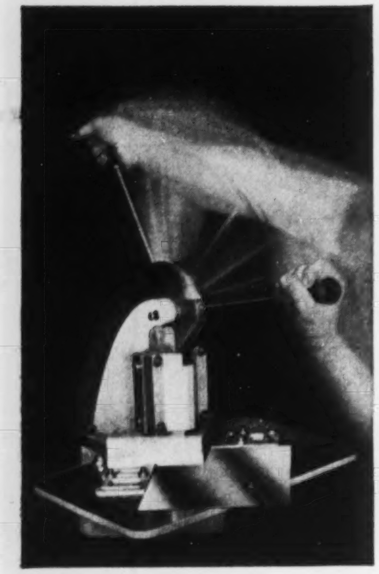

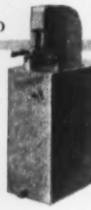

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Production Pointers from GISHOLT

TIME-
SAVING
IDEAS

Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help you cut time and costs in your own work.

FINISHING LARGE AND SMALL DIAMETERS AT THE SAME TIME

Speeder-Operated Boring Bar Does the Trick

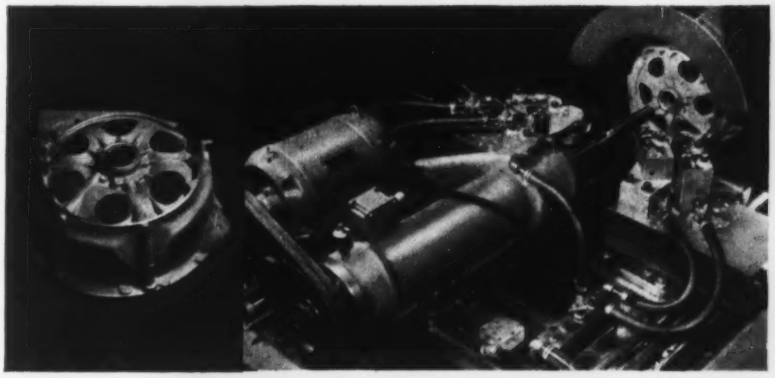
How to achieve both high speed and fine finish on these die-cast aluminum torque converter housings? Here's a nice example of production planning that does it!

This fast, two-operation job is done on a pair of Simplimatic Automatic Lathes. For the first side, the workpiece is clamped on the large flange face by means of an air-operated drawback fixture with location and drive from dowel holes in the flange. Tools mounted on the front and rear slides rough and finish face.

While the front and rear slides are working, tools on a special speeder-equipped, piloted boring bar mounted on the center slide bore and chamfer. Spindle speed is 500 r.p.m., and with the speeder operating, boring speed is increased to 800 r.p.m.—just the right combination of speeds for uniform finish on the machined surfaces. Time for this operation is under 1 minute f.t.f.

Same Operator Runs 2nd Machine

For the final operation, a special air-operated drawback fixture is also used, locating and driving from dowel holes in the large flange. Part is held against large flange face by clamping through three cored holes. There is a vibration dampener between the fixture and large flange face for quieter operation and prevention of possible chatter.



◆ ***First Machine*** with special speeder-operated boring bar.

Second Machine also has special boring bar speeder arrangement.

Once again tools on the front and rear slides rough and finish face while tools on the special, speeder-equipped, piloted boring bar counterbore and chamfer. Again, time is less than 1 minute, f.t.f. One operator can easily handle both machines with hourly production totaling 48 completed housings at 80% efficiency.

Rotating the boring bar as well as the work provides correct speeds for machining all surfaces while saving time and achieving fine finish.

There's a great deal of interesting information in the pages of the Simplimatic catalog; also many helpful job reports. Write for your copy.

ENSURE YOUR FUTURE PROFITS...

TIME-SAVING IDEAS

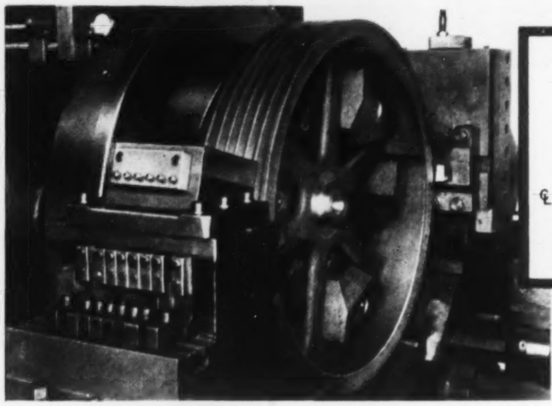
GOOD TIPS ON MACHINING SHEAVES

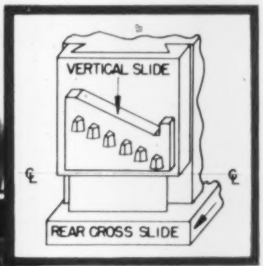
Novel Tooling on Fastermatic *Automatic* Turret Lathe

Everybody's looking for new ways to get speed and quality at lower cost! Aren't you? Here's a fine example of how you can do it in machining large sheaves.

The 23″ diameter parts are handled on a Fastermatic Automatic Turret Lathe. All work on the hub is performed with standard tools on the hexagon turret—drilling, boring, reaming, facing and turning. Tools on a special back-facing attachment, operated through the spindle, face and turn the opposite end.

Of special interest is the unique method of machining the six grooves. First, tools on a special tool block mounted on the front slide rough out the grooves and chamfer the edges. Then, via a smart skiving operation, the grooves are finish-formed. This is done by six tools carried in a special vertical slide mounted on the rear slide. After the rear slide feeds in to a dead stop and holds up, the vertical slide feeds downward. Each tool is mounted slightly higher than the tool preceding it. One tool at a time cuts its groove as it feeds past the center line—assuring fine, smooth finishes with no distortion trouble.





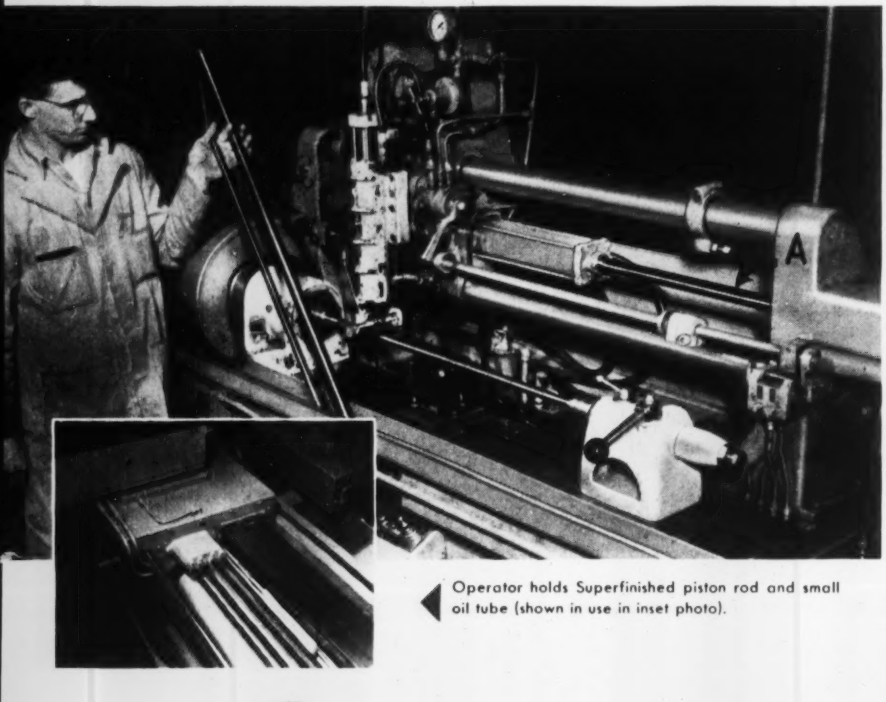
The 23″ sheave and front slide tooling. Drawing shows tool arrangement of special vertical slide mounted on rear slide.

This novel single-tool method of finish-forming the grooves eliminates distortion to assure better finish. Automatic production cuts costs.

* * *

PUTTING AN END TO OIL SEAL PROBLEMS

Low-Cost Superfinish Means Better Operation—Less Maintenance



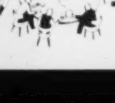
◀ Operator holds Superfinished piston rod and small oil tube (shown in use in inset photo).

In more and more cases, Superfinishing is becoming a part of original specifications. Here it was specified to prevent oil seal troubles and provide more satisfactory and lasting service.

The smaller tube held by the operator is a telescoping connection carrying high-pressure oil to carriages and slides on Gisholt No. 24 Hydraulic Automatic Lathes. For a positive oil seal, the full length is Superfinished to 2½ to 3½ micro-inches from a ground surface of 20 to 30 micro-inches. The same is true of the large rod which is a hydraulic cylinder piston rod similar to "A" on this Superfinishing machine.

Superfinish removes all smear metal left from previous grinding operations. It also eliminates chatter marks and grinding flats which normally cause excessive packing wear and frequent servicing.

Low micro-inch surface readings are quickly obtained at little cost with this Superfinisher which does the job in a fast, automatic cycle.



LOOK AHEAD... KEEP AHEAD... WITH GISHOLT

...WITH MODERN MACHINE TOOLS

GISHOLT

TIME-
SAVING
IDEAS

THEY WASTE NO TIME HERE...IN PRODUCTION OR CHANGEOVER

117 Parts per Hour with No. 12 Hydraulic Automatic Lathe

A simple enough machining job, this one. But it shows what can be gained by careful start-to-finish planning.

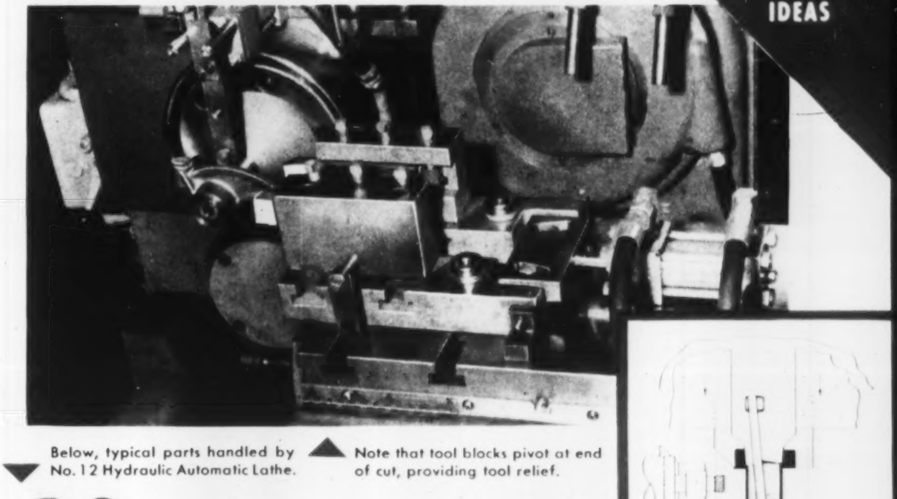
The problem is twofold—speedy straddle facing for these parts, and at the same time—fast, easy changeover for 13 different sizes.

The machine is a Gisholt No. 12 Hydraulic Automatic Lathe—a machine you can't beat for work of this kind. In this case, all work is done from the rear slide, leaving the front of the machine clear for extra-fast loading and unloading.

The workpiece is slipped on an air-operated expanding mandrel, locating from the face of the rocker web against an adjustable jack at the base of the air-operated retractable locator.

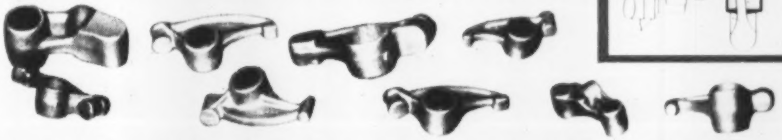
To start the cycle, the operator raises a single lever which chucks the part on the mandrel and retracts the locator which in turn actuates a limit switch starting the machine. The rear independent slide feeds forward with tools straddle-facing both hubs. There is tool relief at the end of the cut. Fast starts and stops are provided by the electric clutch and brake. Production is at a rate of 117 parts hourly at 80% efficiency.

As for swift, simple changeover, here's all there is to it: an easy sideward adjustment of tool blocks is made in T-slotted bases; the locator jack is altered and the mandrel is changed for size.



▼ Below, typical parts handled by No. 12 Hydraulic Automatic Lathe.

▲ Note that tool blocks pivot at end of cut, providing tool relief.



Nearly 2 parts a minute are produced here because of fast loading, starting and machining provided by the No. 12 Automatic Lathe.

Twenty-eight interesting examples of quality production of both simple and complex parts are pictured in the complete new No. 12 catalog. Write for it.

★ ★ ★

CAN THIS KIND OF BALANCING HELP YOU?

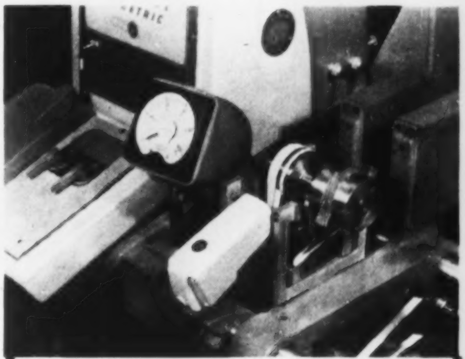
Workpiece is handled in overhanging position

High-speed shaper heads used in woodworking must be accurately balanced. This eliminates vibration during operation, preventing "ripple" or "chatter" marks from marring molding surfaces.

This manufacturer of woodworking equipment solved his problem by dynamically balancing all shaper heads. To simplify and speed up the balancing operation, the Gisholt Improved Type S Balancer is used. With this machine, the workpiece can be balanced in an *overhanging* position—to make loading easier and faster. Correction is made by drilling radially to the indicated depth in the left and right correction planes.

Production balancing to fine tolerances is "everyday work" for Gisholt Balancers. Both large and extremely small amounts of unbalance can be accurately measured and located because amplification is infinitely variable. Bearing movements as little as .000025" are accurately indicated on the standard machine.

Two-plane balancing of these high-speed parts is made faster, easier by use of overhanging arbor.



MODERN PRODUCTION BALANCING is one of many important subjects taught in the Gisholt Balancing School. Write for details.

DYNETRIC BALANCERS GISHOLT
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TIME-
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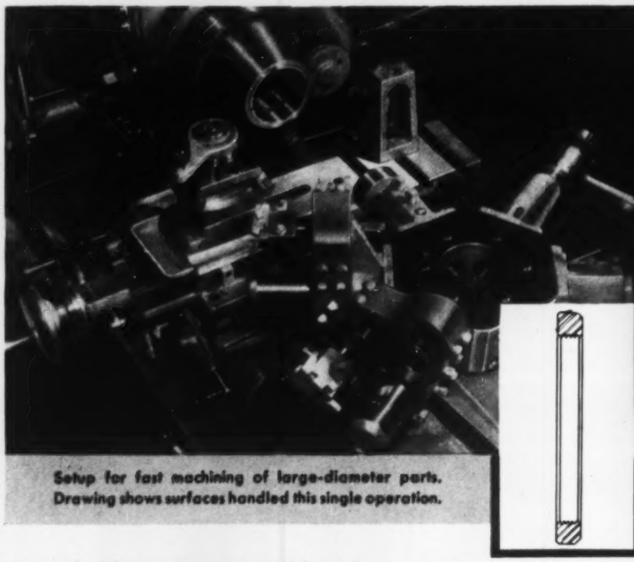
RAM TYPE TURRET LATHE DOES KING-SIZE WORK

Gisholt No. 5 Has Extra-Large Spindle Bore for Light Bar Stock, Tubing, Plastics


Setup for fast machining of large-diameter parts. Drawing shows surfaces handled this single operation.

It isn't often that ram type jobs call for a 4½" spindle bore. When sizes do get in this neighborhood, you may be able to cut costs even before the job is started. How? By proper selection of the machine.

This job illustrates the point. The large fuse liner nuts (and similar parts) are made from 4½" diameter seamless steel tubing. A Gisholt No. 5 Ram Type Turret Lathe was selected because it was available as a standard machine with a 4½" capacity spindle bore.

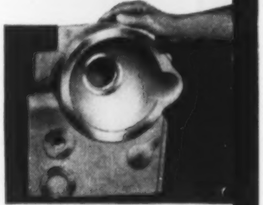
Machining the fuse liner nuts consists of facing, rough and finish boring and turning, chamfering, threading the I. D. and cutting off. Floor to floor time is 2.3 minutes.

The customer is really taking advantage of the faster, easier operation of this ram type machine. It has a hydraulic collet chuck and bar feed and a turret threading attachment. Even so, the cost is considerably below that of the larger type machine which usually handles this size work.

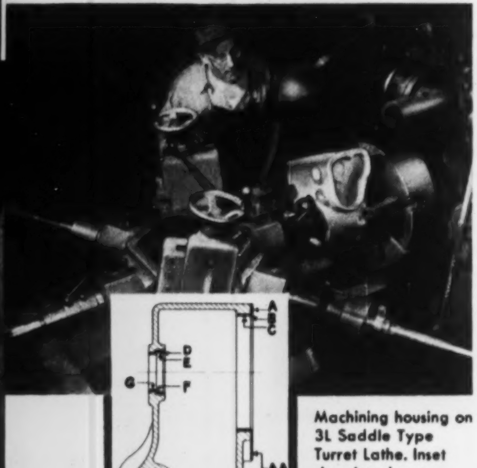
The first and most important step in cost saving here was in selecting the right machine for the job...the standard No. 5 Ram Type Turret Lathe with 4½" spindle bore. From then on low costs were easy.

* * *

REPETITIVE ACCURACY MADE CERTAIN THIS WAY



Dial Indicator on Saddle Type Turret Lathe Gives Visual Check



Machining housing on 3L Saddle Type Turret Lathe. Inset drawing shows machined surfaces.

What's the best way to maintain close tolerances in machining these awkward cast iron housings? This struck us as a pretty good answer.

Using a Gisholt 3L Saddle Type Turret Lathe, the large irregular-shaped workpiece is held in a 4-jaw independent chuck. Three diameters —*C, E* and *G*—are step bored and *D* is chamfered by tools mounted on piloted boring bars. The distance between face *A* and the base of cobore *F* is closely maintained, and a visual check of machine accuracy is provided by the dial indicator mounted on the finish boring bar. Line boring assures concentricity and permits holding close tolerances, part after part.

While boring takes place, tools on the square turret are used to face the front plate surface *A*, three bosses, *AA*, and chamfer *B*. Simultaneous use of tools on the hexagon turret and square turret shows there's time being saved . . . an easy matter with the full-swing side carriage and cross-slide features of the Gisholt Saddle Type Lathe.

Good chucking, good tooling with special attention to accuracy aided by a dial indicator assures a good rate of production with uniformity.

No. 7-854
627

GISHOLT

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

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MACHINE COMPANY **Madison 10, Wisconsin**

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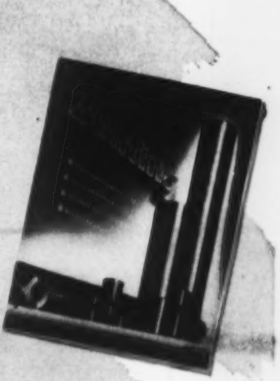

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with UDYLITE equipment, sales grew and grew and grew—*automatically*

From this simple beginning...

The Remarkable Account of How a Basement Plating Shop Expanded to a Big Producer

On Helen Avenue, in Detroit, stands an eloquent symbol of the remarkable improvements that take place in a plating plant when executive management makes the decision to *go automatic* . . . with Udylite.

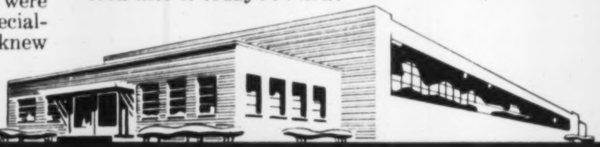
Lee Silver Service, Inc. supplies precision plated parts to automotive and appliance companies, in quantities running into the millions. Production surpasses 80,000 precision plated parts daily . . . yet, consider . . .

This business, started only 15 years ago, was once a two-man operation in a basement . . . so small that their first month's plating supplies were carried into the shop in one hand by the Udylite delivery man.

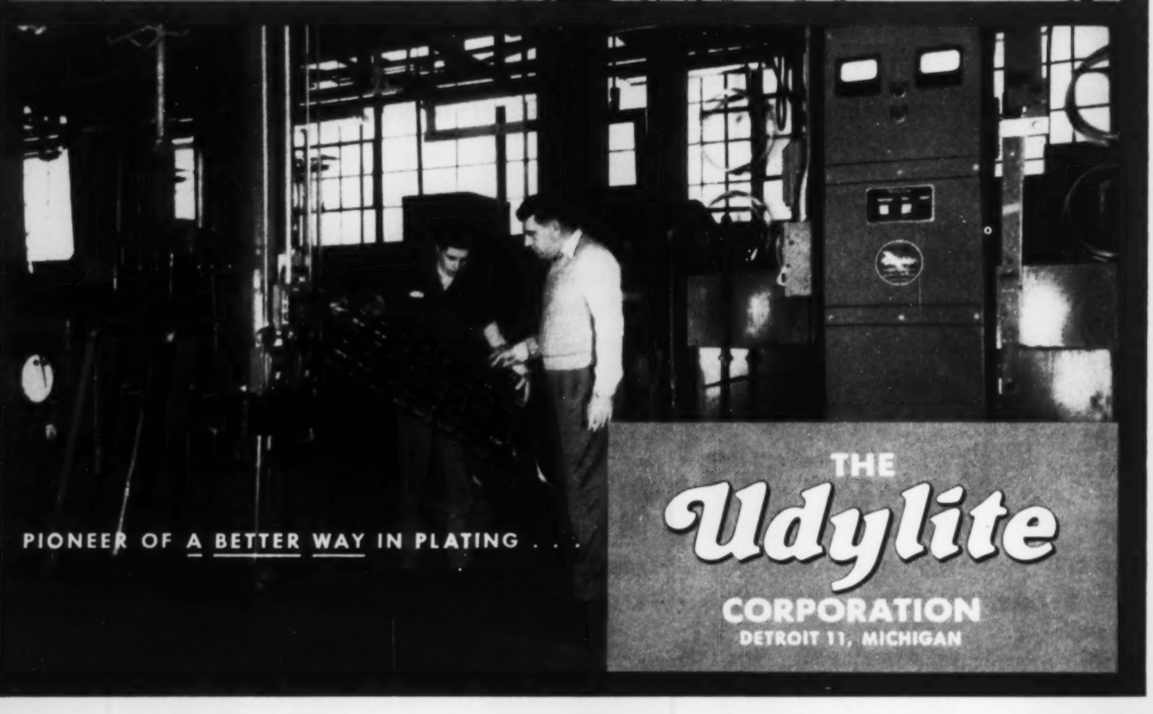
But the men behind Lee Silver Service, Inc. were sold on the great potential for a company specializing in gold and silver plating . . . and they knew their future would ultimately include the finest in automatic plating machines. When, in 1947, they landed the biggest order for silver and gold plating ever sold—supplying silvered cabinets and gold fittings for the anniversary model of a famous automatic washing machine—they knew the days of hand-delivered supplies were a thing of the past.

During this development Udylite and Lee Silver worked hand in hand. Today this company is 100% Udylite automatic. Sales have soared. Production has zoomed. Rejects have been cut to .4 of 1%. Yes, progress and growth have come . . . *automatically!*

If *you* are in the plating business to stay, it's inevitable that you, too, will come to Udylite automatic equipment eventually . . . why not look into it today . . . *now.*

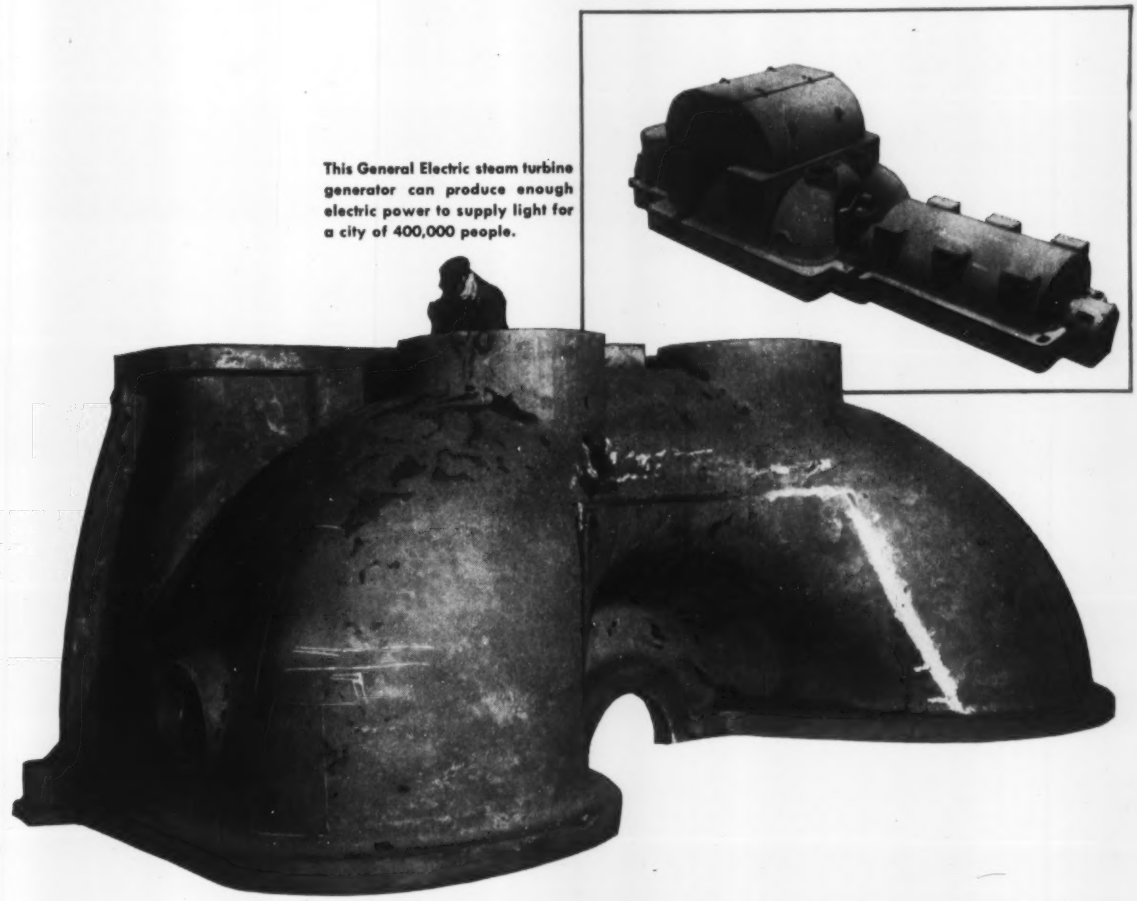


. . . to this completely automatic plating plant—with Udylite equipment and technical guidance *all the way!*



PIONEER OF A BETTER WAY IN PLATING . . .

THE
Udylite
CORPORATION
DETROIT 11, MICHIGAN



This General Electric steam turbine generator can produce enough electric power to supply light for a city of 400,000 people.

Chateaugay Pig Iron Used

In Casting 55-Ton Exhaust Hood

Castings like this huge turbine exhaust hood are produced regularly by General Electric.

Their foundry specifications are strict. To meet these requirements they use only the finest pig irons in their cupola mixture—including Republic Chateaugay.

Many casting producers use Chateaugay iron to obtain high strength, uniformity and machinability throughout every casting. Chateaugay castings have an unusually fine and uniform grain structure, and surfaces with high wear-resistance.

In addition, Chateaugay castings machine easily and economically.

For the complete story on Chateaugay, the low-phosphorus, copper-free pig iron, call in a Republic Pig Iron Metallurgist. There is no cost or obligation for his services. Let us know when you would like him to call.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

REPUBLIC PIG IRON

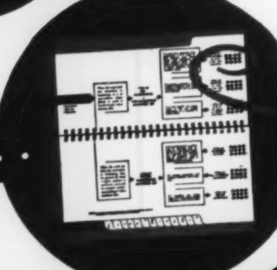
REPUBLIC STEEL

How

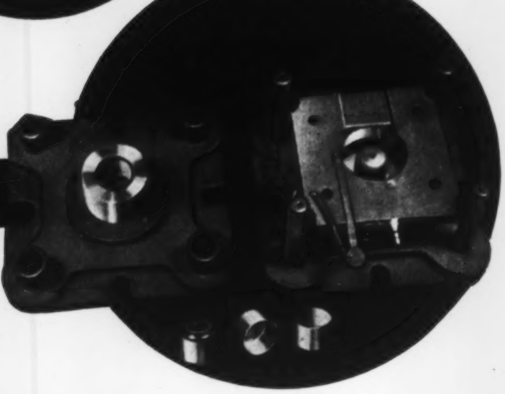
ONE TOOLMAKER . . .

—then use
HAMPDEN
(Oil-Wear)
or No. 610
(Air-Wear)

USED THIS GUIDE . . . .



TO HOLD DOWN UNIT COSTS . . .



AT which step in your tooling process would you welcome real help in reducing tool and die costs? Tool Steel Selection? Heat Treating?—or on-the-job "Trouble-Shooting"? Here's how you, like the maker of the Dies shown here, can start to reduce costs with a Method that helps you at *all 3* steps.

First, to simplify selection, use the handy Selector Section in the Carpenter Matched Tool Steel Manual. Quickly and surely, it enables you to put your finger on the proper steel for best results. Next, to further insure tool and die performance, use the Manual's complete heat treating instructions—they have been simplified beyond anything previously known. It's easy to get started—use the Carpenter Matched Set Method to help you "trouble-shoot" your present tool and die jobs.

For better, lower-cost tooling, put this practical, easy-to-use Method to work, now. Ask for the 189-page Carpenter Matched Tool Steel Manual—just see your Carpenter representative. The Carpenter Steel Company, 139 W. Bern Street, Reading, Pa.

Job:
Compound Blank and Draw Die for forming .031", ¼-hard brass Vent Valve Bodies at the rate of 103 per minute on a punch press.

Problem:
Unit costs were on the upswing because the old dies wore too rapidly, causing frequent and costly machine shutdowns for regrinding.

Solution:
Looking for a die steel with maximum wear resistance, the toolmaker referred to the Selector Section in the Carpenter Matched Tool Steel Manual, and quickly arrived at Carpenter *Hampden* (Oil-Wear).

Heat Treatment:
Simplified instructions in the Manual were followed.

Results:
2 hours of costly machine downtime were eliminated *each day*—production per grind *rose over 300%!* As a matter of interest, the toolmaker takes off approximately .0005" per stoning and gets about 100 grinds from the Blank and Draw Die.

IMMEDIATE DELIVERY FROM LOCAL STOCKS!

Call Your Nearest Carpenter Warehouse or Distributor

Carpenter STEEL

Matched Tool and Die Steels

Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Mill-Branch Warehouses and Distributors in Principal Cities Throughout the U. S. A. and Canada

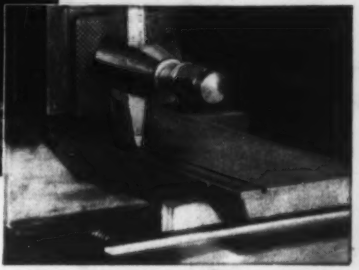
Form Tools

Dies from Templates

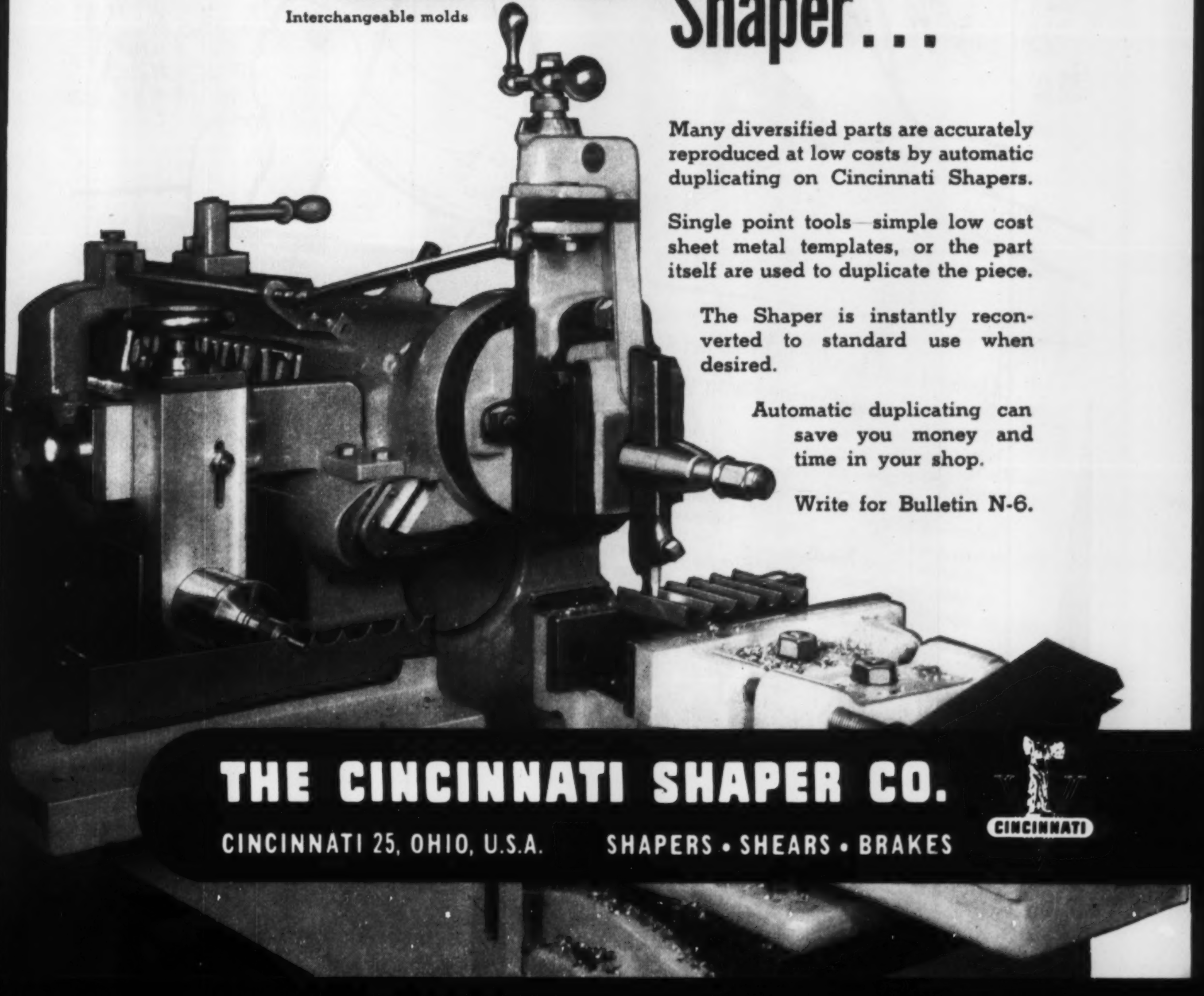
Facing 90° shoulders

Automatic duplicating of MANY shapes on a Cincinnati Shaper...

Duplicating a Cam



Interchangeable molds



Many diversified parts are accurately reproduced at low costs by automatic duplicating on Cincinnati Shapers.

Single point tools—simple low cost sheet metal templates, or the part itself are used to duplicate the piece.

The Shaper is instantly reconverted to standard use when desired.

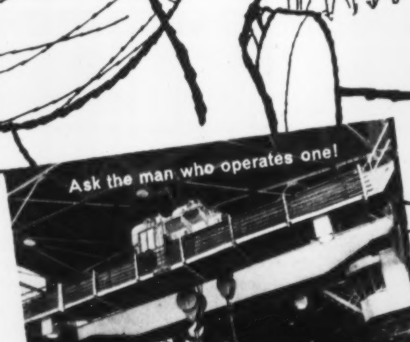
Automatic duplicating can save you money and time in your shop.

Write for Bulletin N-6.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

"At last-someone thought of me!"


Ask the man who operates one!

"...now—I can handle light or heavy loads easier, smoother and with greater accuracy."

It's true . . . any crane operator can do a more efficient job with Whiting's new magnetic Selectodyne hoist control. Having eleven instead of the conventional five speed selection points, Selectodyne permits precision handling of any load . . . light *or* heavy. Selectodyne provides *easier*, *smoother* load handling at speeds that assure the utmost in safe, sure crane control. Simple in design, trouble-free in operation, Selectodyne is another reason why Whiting Engineered Cranes perform better at lower cost!

WHITING CORPORATION
15643 Lathrop Ave., Harvey, Illinois

WHITING

NEW WHITING SELECTODYNE MAGNETIC HOIST CONTROL

New Selectodyne Folder

Gives complete information on the advantages of this remarkable new control. Write for your copy today!

CALENDAR
OF MEETINGS

July 22-23, Truck-Trailer Manufacturers Association Inc.: Summer meeting, Edgewater Beach hotel, Chicago. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

August 2-4, National Tool & Die Manufacturers Association: Board of trustees and committee meeting, Grand hotel, Mackinac Island, Mich. Association address: 907 Public Square Bldg., Cleveland 13. Executive secretary: George S. Eaton.

August 8-12, American Society of Sanitary Engineering: Annual meeting, Muehlebach hotel, Kansas City, Mo. Society address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

August 16-18, Society of Automotive Engineers Inc.: National West Coast meeting, Hotel Statler, Los Angeles. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 25-27, Western Electronic Show & Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Business manager: Mal Mobley Jr., 344 N. La Brea Ave., Los Angeles 36.

August 30-September 3, Automotive Electric Association: Annual fall meeting, Vanss Springs hotel, Vanss Springs, Alberta, Canada. Association address: 802 Michigan Bldg., Detroit. Executive secretary: S. W. Potter.

September 1-16, International Electrotechnical Commission: Golden jubilee meeting, University of Pennsylvania, Philadelphia. Information: D. E. Denton, Public Relations Dept., American Standards Association, 70 E. 45th St., New York 17.

September 4-8, Pressed Metal Institute: Annual fall meeting, Manoir Richelieu hotel, Murray Bay, P.Q., Canada. Institute address: 2860 E. 130th St., Cleveland. Managing director: O. B. Werntz.

September 7-9, Industrial Truck Association: Fall meeting, Greenbrier hotel, White Sulphur Springs, W. Va. Association address: Washington Loan & Trust Bldg., Washington 4. Secretary: William Van C. Brandt.

September 7-9, National Fluid Power Association: Fall meeting, Hotel Commodore, New York. Association address: 1618 Orrington Ave., Evanston, Ill. Secretary: Barrett Rogers.

September 8-10, American Society of Mechanical Engineers: Fall meeting, Schroeder hotel, Milwaukee, Wis. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

September 8-10, Porcelain Enamel Institute Inc.: Shop practice forum meeting, Urbana-Lincoln hotel, Urbana, Ill. Institute address: 1346 Connecticut Ave., N.W., Washington 6. Secretary: John C. Oliver.

September 10-11, Metal Powder Association: Fall closed meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

September 11-14, Packaging Machinery Manufacturers Institute: Annual meeting, Grove Park Inn, Asheville, N. C. Institute address: 342 Madison Ave., New York 17. Secretary: Miss Helen L. Stratton.

September 12-15, National Metal Trades Association: Eastern plant management conference, Sagamore hotel, Lake George, N. Y. Association address: 122 S. Michigan Ave., Chicago 3. Secretary: Charles L. Blatchford.

September 12-17, American Chemical Society: Fall meeting, Statler hotel, New York. Society address: 1155-16th St. N. W., Washington 6. Executive secretary: Alden H. Emery.

September 13-14, American Coke & Coal Chemicals Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 711 14th St. N.W., Washington 5. President: Samuel Weiss.

September 13-15, Allied Railway Supply Association: Annual meeting and exhibit, Hotel Sherman, Chicago. Association address: 1200 W. Chase Ave., Chicago 26. Secretary: C. F. Weil.

a fashion note
styled with
the help of
Lebanon
stainless steel
Castings

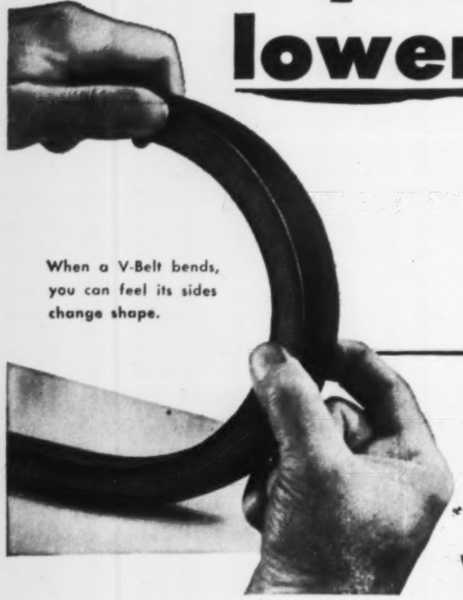
To create the lasting color-beauty of fabrics woven from new synthetic fibers, these fabrics are dyed under pressure at elevated temperatures in a process employing highly corrosive acids. Gaston County Dyeing Machine Company, Stanley, N.C., uses corrosion-resistant Lebanon Circle ⓛ Stainless Steel Castings for vital parts of their textile dyeing equipment which is in service all over the world. These Lebanon castings, produced in materials that are engineered for the service, have been found more economical than fabrications, and their outstanding corrosion-resistant properties play a major role in holding the color integrity of the lovely new fabrics.

Lebanon Steel Foundry
Lebanon, Pennsylvania

In Gaston County's dyeing machines as well as many other installations, Lebanon has been successful in filling needs with castings correct in every detail. Your inquiry will receive prompt attention.

CIRCLE L
Lebanon
Carbon, Low Alloy and Stainless Steel
Castings

if you want **lower** V-Belt **costs**—



When a V-Belt bends, you can feel its sides change shape.

just make this simple test

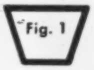


Fig. 1

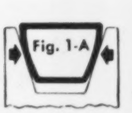


Fig. 1-A

Take *any* V-belt that has *straight* sides (Fig. 1). Bend that V-belt while you grip its sides with your fingers. You will *feel* the sides *bulge out* (Fig. 1-A). Clearly, that out-bulge forces the belt to press *unevenly* against the V-pulley—and this *concentrates* wear at the points shown by arrows (Fig. 1-A).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

(U.S. PAT. NO. 1813698)

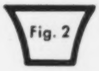


Fig. 2

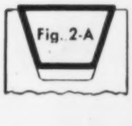
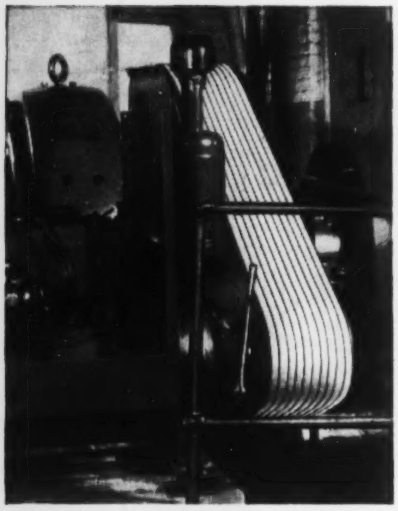


Fig. 2-A

Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* and become perfectly straight. This belt, when bent, *precisely fits* its sheave groove (Fig. 2-A). The sides of the Gates Vulco Rope press *evenly* against the V-pulley. Therefore, wear is distributed *uniformly* across the *full face* of this belt—resulting in *longer* belt life and *lower* belt *costs* for you!



Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

When you buy V-belts, be sure to get the V-belt with the Concave Sides—the Gates Vulco Rope!

Gates VULCO ROPE **DRIVES**

REG U S PAT OFF

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

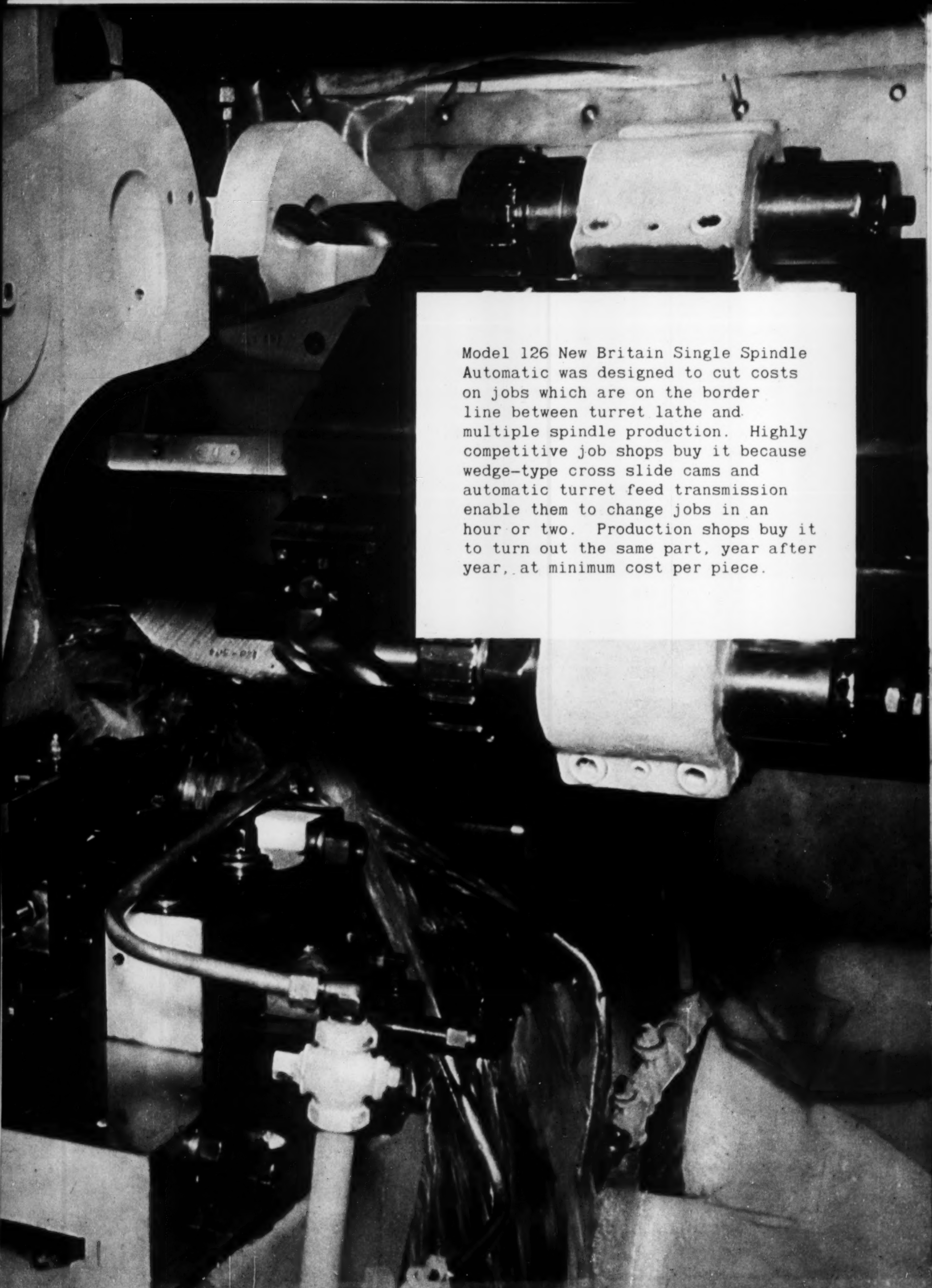
THE GATES RUBBER COMPANY
DENVER, U.S.A.

CS-543

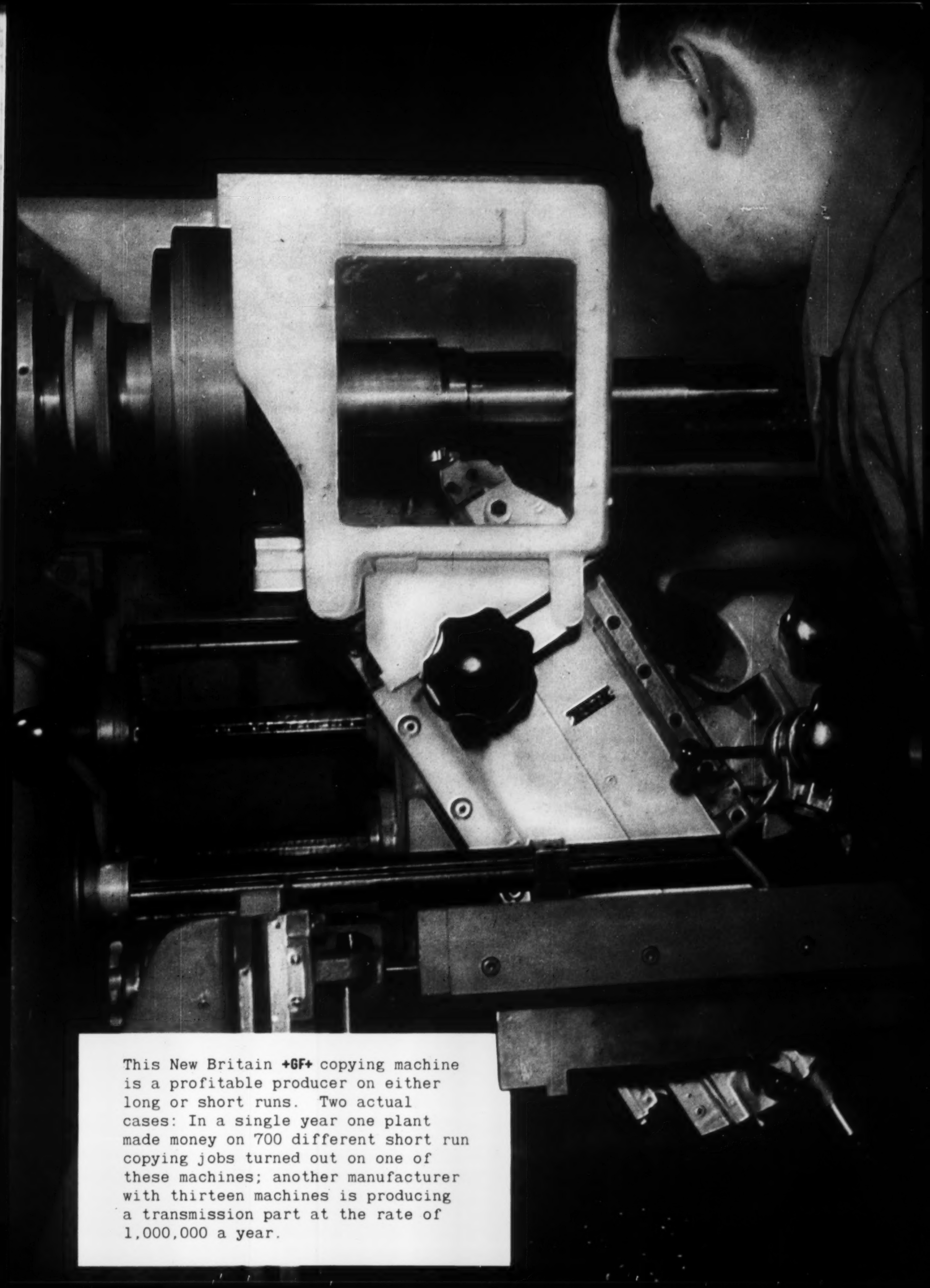
This record-breaking high production brass job can only be produced economically on a rugged automatic running at high spindle speeds. Such a combination is not only necessary for brass and aluminum but equally important for carbide tools. New Britain Model 601 was specifically designed to profitably handle such long runs of complex pieces at high speeds. However, it also has set-up features which cut down-time to a minimum on short run jobs where quick changeover is a must. For machines principally designed for shops where the chief emphasis is on close bid short run work, see the two following pages.

THE NEW BRITAIN MACHINE CO

NB



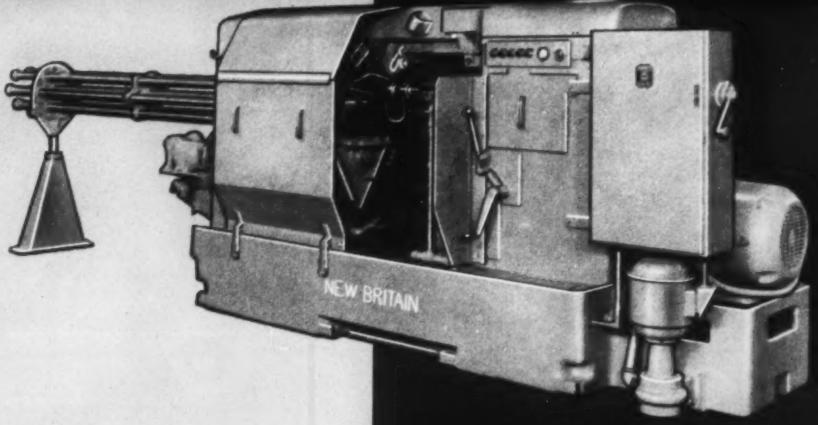
Model 126 New Britain Single Spindle Automatic was designed to cut costs on jobs which are on the border line between turret lathe and multiple spindle production. Highly competitive job shops buy it because wedge-type cross slide cams and automatic turret feed transmission enable them to change jobs in an hour or two. Production shops buy it to turn out the same part, year after year, at minimum cost per piece.



This New Britain **+GF+** copying machine is a profitable producer on either long or short runs. Two actual cases: In a single year one plant made money on 700 different short run copying jobs turned out on one of these machines; another manufacturer with thirteen machines is producing a transmission part at the rate of 1,000,000 a year.

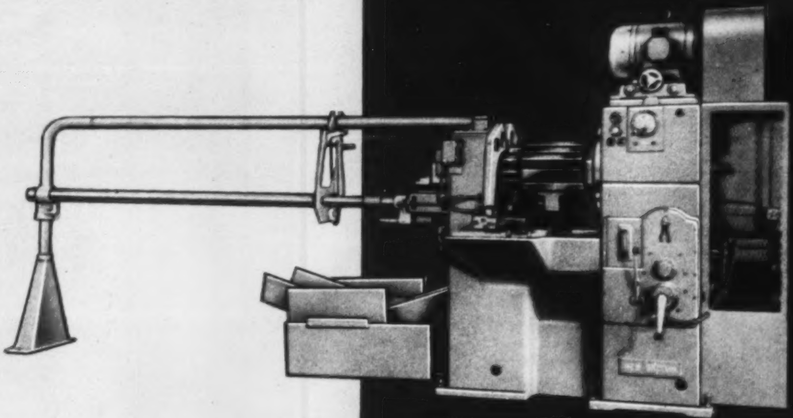
MODEL 601

Six Spindle Automatic Bar Machine, 1¼" capacity. Massive, powered for tough forming steel jobs, and with super high spindle speeds for non-ferrous metals. Cross slides in each position are actuated by small disc type cams mounted directly behind the side.



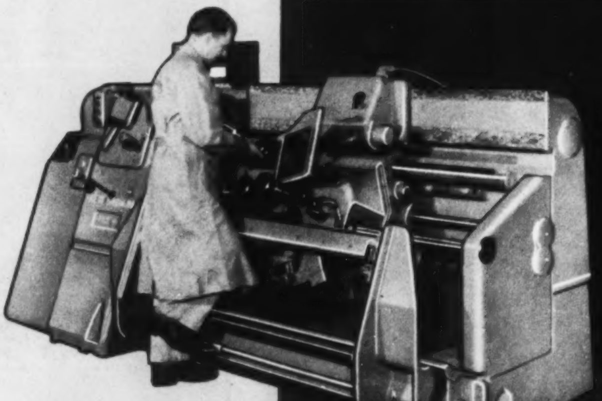
MODEL 126

Single Spindle Automatic. Capacity 2⅝" x 6". No cam changes for main turret feeds • No pick-off gears to change in selecting speeds and feeds • Quickly adjustable standard wedge cams for cross slide feeds • Automatic cycle completely controlled from central drum • Pre-selected, automatically changed feeds for each of five turret stations.



NEW BRITAIN +GF+

Copy Turning Machine eliminates the conventional lathe bed. Chips fall free and accumulate through the back of the machine. Copying carriage is mounted below the spindle. Every control is at the operator's finger tips, and template or prototype is also on the front of the machine. Self-contained pumping unit in carriage eliminates the nuisance of flexible hose. Powerful drive and a wide range of speeds and feeds make it a profitable producer on runs of any length.

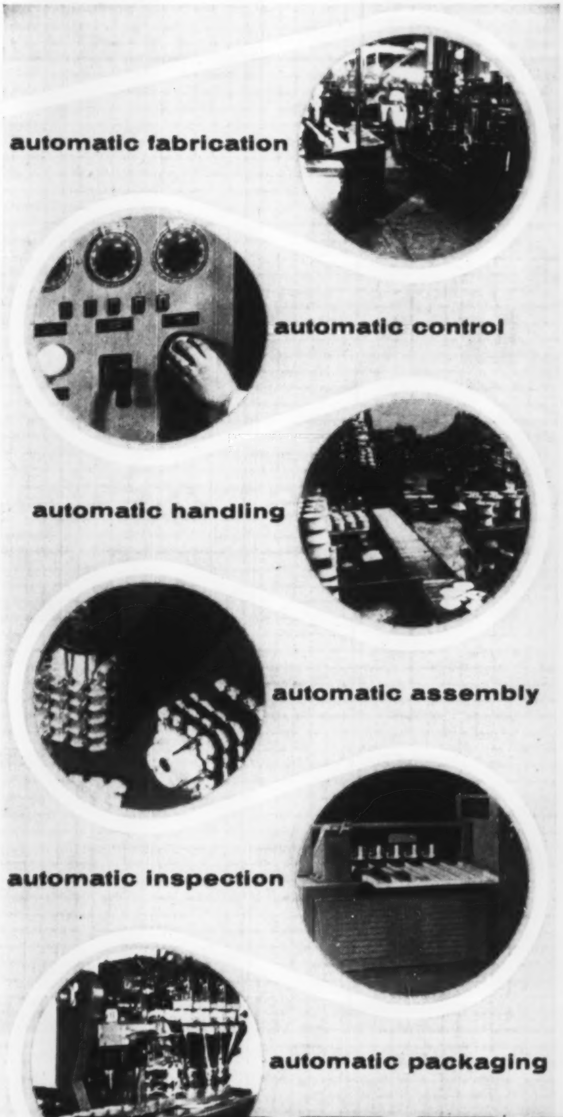


Our general catalog is filed in the Sweet's Machine Tool Catalog File.

AUTOMATIC BAR and CHUCKING MACHINES • PRECISION BORING MACHINES
LUCAS HORIZONTAL BORING, DRILLING and MILLING MACHINES
NEW BRITAIN +GF+ COPYING LATHES

The NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division, New Britain, Connecticut


automatic fabrication
automatic control
automatic handling
automatic assembly
automatic inspection
automatic packaging

new ways of doing things
automatically-
a challenge to every
industrial operation

a challenge
—to management and engineering executives in all industry who must make more goods, for more people, at lower cost.

A challenge, too, to the executives in companies making products that must be made more automatic. And finally a challenge to consulting engineers recommending and specifying machines and equipment for automatic operations.

The answers to help meet this challenge will be found in the pages of the *one* magazine dealing solely with all manner and method of automatic operation. It is the first and only magazine to examine automatic operation whenever, wherever and however it may appear.

AUTOMATION

AUTOMATION

A new Penton monthly magazine packed with practical information about automatic operation. First issue out in August. Look for it!

PENTON BUILDING · CLEVELAND 13, OHIO

come
and
get it

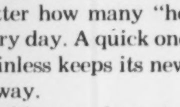
STAINLESS STYLE

This mobile canteen, a light truck conversion by Davis & Sewell of Baltimore, illustrates some vitally important properties of Crucible Rezistal® stainless steels.

To begin with, Crucible stainless is easy to keep clean, no matter how many "hot-dogs-with-the-works" are put out every day. A quick once-over with soap and water, and the stainless keeps its new look – the surface can't chip or wear away.

Probably more important – Crucible stainless is truly a *practical shop metal.* You can bend it, draw it, spin it, weld it, machine it – do anything with stainless, in fact, that you can do with ordinary steel. At the same time, your designs can take full advantage of stainless steel's superior physical properties and corrosion-resistance to save weight without sacrificing strength.

So remember: corrosion-resistance isn't the *only* outstanding property of Crucible stainless steels. These famous alloys also feature excellent fatigue, creep and structural strength . . . high abrasion-resistance . . . resistance to high or low temperatures . . . practical workability. Let us show you how stainless can help solve some of your knotty problems. For prompt action – just call Crucible.



CRUCIBLE first name in special purpose steels

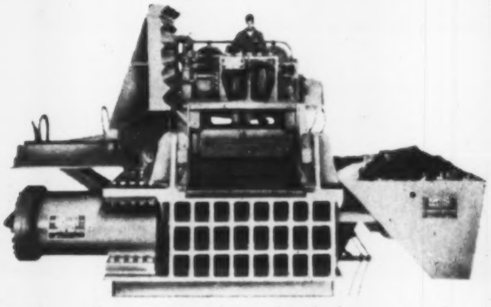
54 *years of* Fine *steelmaking*

STAINLESS STEELS

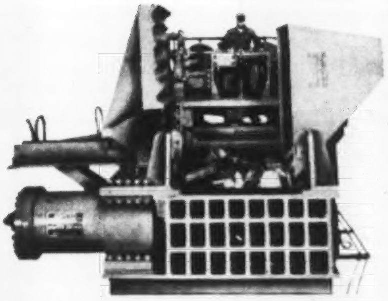
CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

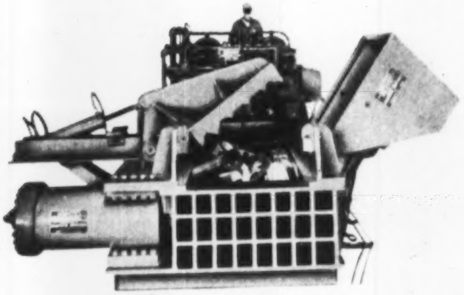
Canadian Distributor — Railway & Power Engineering Corp., Ltd.



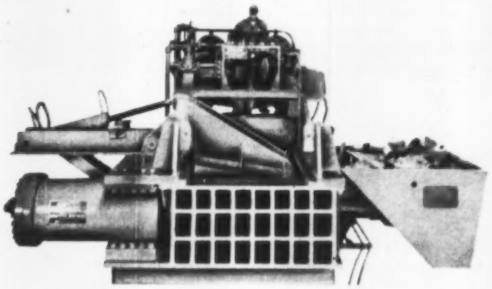
1. Here Skip Pan has been loaded.



2. Skip Pan dumps load into charging box.

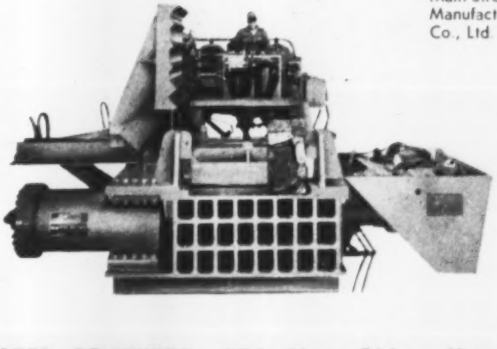


3. Auxiliary-Compression Door starts its compression stroke as Skip Pan returns to be re-loaded.



4. Auxiliary-Compression Door crushes scrap into charging box.

5. At right the Auxiliary-Compression returns to up-right position and charging box door closes. Scrap is baled and then ejected. Skip Pan has been re-loaded and is ready to re-fill the charging box.



Dempster-Balester Auxiliary-Compression Door becoming a MUST for scrap metal baling

Before buying a scrap metal baling press, it is important to know that the Auxiliary-Compression Door is available exclusively for Dempster-Balesters. This door completely eliminates in some operations and materially reduces in others the costly process of tying up two or three extra men as arrangers. In addition, the hydraulically operated Auxiliary-Compression Door normally crushes scrap with one stroke . . . permitting charging box cover door to close immediately. This means a tremendous increase in production.

This increase in production and savings in man-hour costs have made the Auxiliary-Compression Door virtually indispensable for the greatest economy in scrap metal baling.

A Dempster-Balester Model 600 is shown in operation with Skip Pan Loader and Auxiliary-Compression Door. Note that every operation in the baling cycle is hydraulically controlled from the moment scrap is dumped into Skip Pan Loader until finished bale is ejected.

Write us for complete information. Dempster-Balesters are manufactured exclusively by Dempster Brothers, Inc.

IN CANADA: Sold by W. P. Favorite Co. of Canada, Ltd., 418 Main Street East, Hamilton, Ontario. Manufactured by Hamilton Bridge Co., Ltd.

DEMPSTER BALESTER ®

DEMPSTER BROTHERS, 874 Shea Bldg., Knoxville 17, Tenn.

LOOK TO THIS NEW, PRODUCTION-BOOSTING LINE

NIAGARA
SC2-300-60-48

50 THROUGH 300-TON CAPACITIES

NIAGARA
MACHINE & TOOL WORKS
1879 75 1954

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

For a realistic answer to the metal stamping and forming problems of today. . . and tomorrow

DESIGN MODERNIZATION CONCEALS DRIVING MECHANISM

Fully streamlined, enclosed construction, front and back, provides pronounced advantages. There are no exposed, overhanging flywheel, clutch, brake, intermediate shaft, nor motor in rear of press to obstruct crane service, block light, throw grease and consume floor space unnecessarily . . . yet all parts are quickly accessible.

WORK-SAVING FLEXIBILITY MEETS SHIFTING PRODUCTION NEEDS

Box type welded steel slides are power adjusted through self-locking, worm driven, barrel type connections to accommodate a wide range of die heights and to permit quicker, easier and safer die setting. Niagara electric clutch control provides trouble-free push button operation and a five-position selector switch for ease, safety and efficiency in single stroking, continuous running, jogging, reverse jogging and slide adjustment.

RUGGED, HEAVY DUTY FRAMES PROLONG DIE LIFE

All-steel, rigidly constructed frames, featuring an exclusive triple box section design, provide maximum resistance to deflection from horizontal, diagonal and torsional stresses. Greater accuracy and longer die life are thereby assured.

GREAT SHUT HEIGHT AND LONG SLIDE ADJUSTMENT

Unusually liberal shut height and extremely long slide adjustment, of both one and four-piece frame construction, permit use of a tremendous range of stamping and forming dies.

Hailed as the most progressive step in straight side, double crank press history, the new Niagara SC-2 Press Series could only have originated from a keen insight of today's metal working problems and the more challenging ones of tomorrow. In every detail of design, you'll recognize the unduplicated competence of Niagara engineers. Who else would be more mindful of press users' needs than the men who design and build America's leading and most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work?

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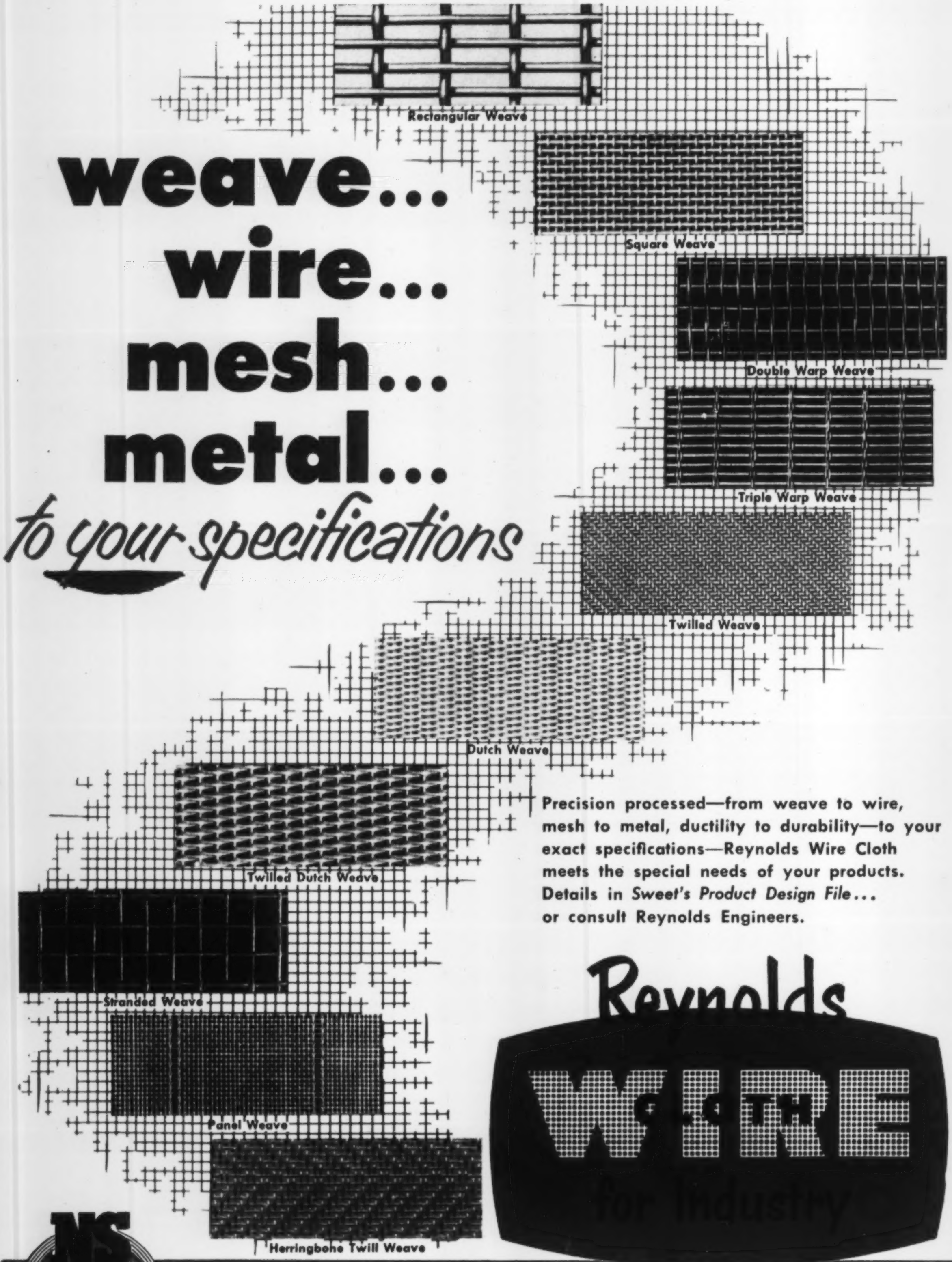
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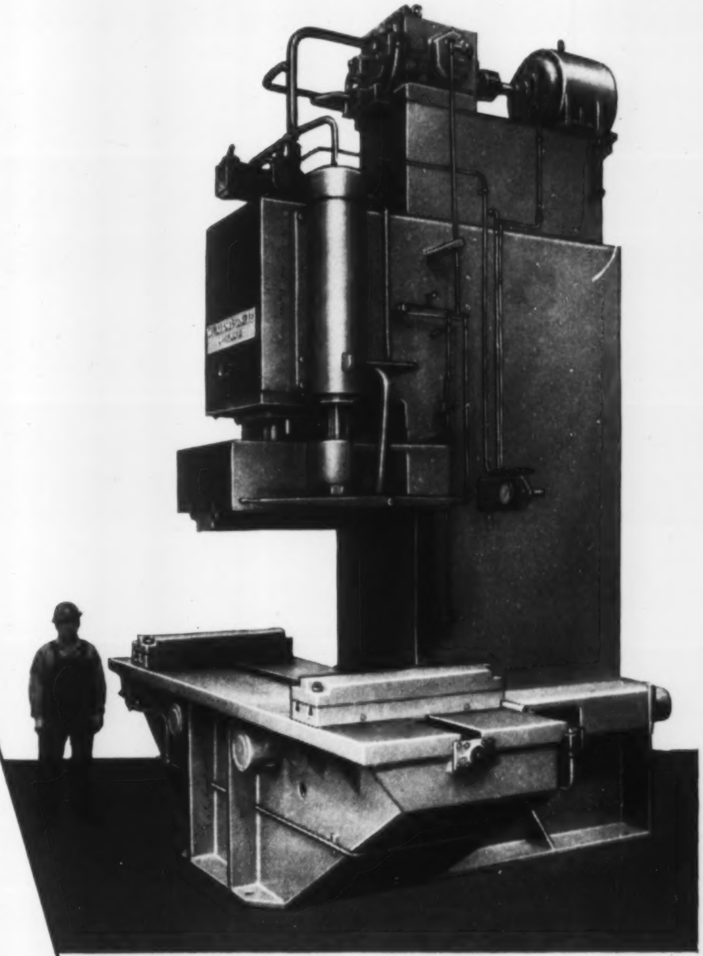

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STEEL
July 19, 1954

Metalworking Outlook

Stainless Waits for Aluminum

Don't look for any price changes in flat-rolled stainless steel until the producers find out what's going to happen to aluminum prices. Flat-rolled stainless and aluminum are competitive. Stainless bar, wire and tube products may be increased soon because they are not so competitive with the light metal. The aluminum pricing decision depends on what happens at Aluminum Co. of America's negotiations with the United Steelworkers of America who represent about 15,500 of Alcoa's 35,000 employees. Expected settlement is the 10-cent hourly wage-insurance-pension pattern set in steel. If that comes, aluminum prices may go up. Then, flat-rolled stainless could also rise. An aluminum wage agreement isn't anticipated much before July 31 when the present contract expires.

A Construction Prop

A continuing strong demand for steel in construction will help to maintain steel output for some time to come, predicts E. G. Grace, Bethlehem Steel Corp. chairman. "In at least four categories of construction—commercial building, nonresidential public building, bridges and highways—1954 promises to be a record or near-record year," he says. "In addition, the nation has a backlog of needed construction which should maintain strong demand for several years to come."

U.S. Inventories Tools

The government, now inventorying the machine tools it owns, won't finish the job for another 18 months. That means there's little likelihood of any spending before the end of 1955 of the $100 million voted by Congress for reserve tools. Defense department originally had $250 million for the purpose. It never spent any of it because it didn't know what was needed. Estimates of government ownership of machine tools range from 400,000 to 550,000.

Four Steps to Mobilization

Office of Defense Mobilization is now taking the third of four steps in the program to eliminate potential defense production bottlenecks. First step, accomplished last winter, was preparation by the Pentagon of a "wanted list" of 1000 weapons and munitions items that would be needed in each of the first three years of a war. Second step was translation of that list into tonnages of metals and estimates of needed parts. Third step, in progress, is the matching of those needs against the country's ability to produce them under wartime conditions, while still meeting the bare-bones needs of the civilian economy. Fourth step, to be announced soon, will be U.S. stockpiling of partly finished products which would be sold to military contractors in wartime.

Big Equipment Market Ahead

About $60 billion worth of capital equipment in U.S. industry is more than ten years old. Within two decades that figure will climb to $200 billion, says S. D. Maddock, president of C.I.T. Corp., industrial financing firm. On the basis of that, he foresees a steadily rising demand for machinery and equipment.

Auto Parts: More Interbuying?

Packard Motor Car Co.—or Studebaker-Packard Corp. when it is formed—may make a deal with American Motors Corp. whereby the two buy parts from one another in a move to cut costs. If a deal goes through, odds are that Packard would supply American Motors with a new V-8 engine. Packard for 1955 will introduce two new V-8s. American Motors' Nash and Hudson divisions have none.

Good Financial Shape

American corporations are in excellent financial shape. Corporate net working capital was an estimated $92.9 billion as of Mar. 31, reports Securities & Exchange Commission. That's a $400-million gain from Dec. 31, 1953. Manufacturing working capital increased by almost $1 billion. The finance group and the transportation industry each showed declines of about $250 million.

Heat's On Air Conditioner Sales

Some 2,435,000 room air conditioners will be built and sold in 1958, predicts H. L. Laube, president of Remington Corp. The 1954 production will be about 1,350,000, compared to 1,010,000 in 1953, 89,320 in 1949 and 42,904 in 1947, the first real year for the industry.

Straws in the Wind

New Brunswick, Canada, has proven reserves of lead, zinc, silver and copper-bearing sulphides at "tens of millions" of tons, estimates Norman B. Buchanan, the province's mines minister . . . New discoveries of 61.5-percent iron add millions of tons to already large reserves of Steep Rock Iron Mines Ltd. . . . General Electric Co. will push sales of its gas turbine as a power generator for oil refiners, electric utilities, chemical producers and operators of ships and gas pipelines . . . Now it's official: Gross national product hit a record $364.9 billion in 1953 . . . Independent Steelworkers Union, representing Weirton Steel Co. workers, won the same settlement as the United Steelworkers, except that more liberal insurance and pension benefits went into effect July 1; the effective date is Nov. 1 for the big union.

This Week in Metalworking

Builders of ocean ships are diversifying to keep afloat (p. 51) . . . The new Studebaker-Packard Corp. may also diversify when it's formed (p. 53) . . . State taxes on business are rising (p. 54) . . . At least one industry, explosives, will have a boom year in 1954 (p. 55) . . . The 100 largest U.S. manufacturers spent $48 billion for goods and services in 1953 (p. 56) . . . The U.S. wants to lease giant special-purpose defense tools to the present users for nondefense work (p. 57) . . . Management at work: The R. J. Wean story (p. 61).

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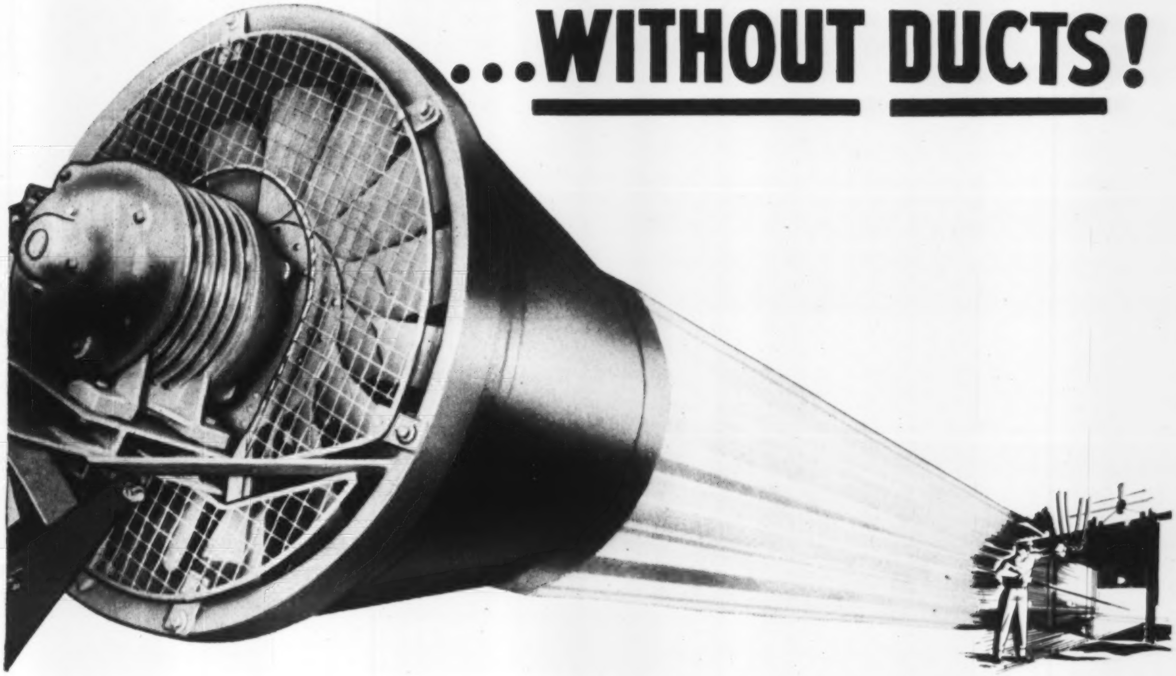

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COOLS WORKERS The "Hy-V" Air Jet spot-cools men exposed to heat from ovens, furnaces, forges or molten metal. Workmen become less fatigued and require less time out.

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These fan units are furnished with wall-mounting brackets or on wheeled stands. Fan wheel diameters range from 18" to 30". Further details are covered in Bulletin DH-8-54. Send for your free copy today.

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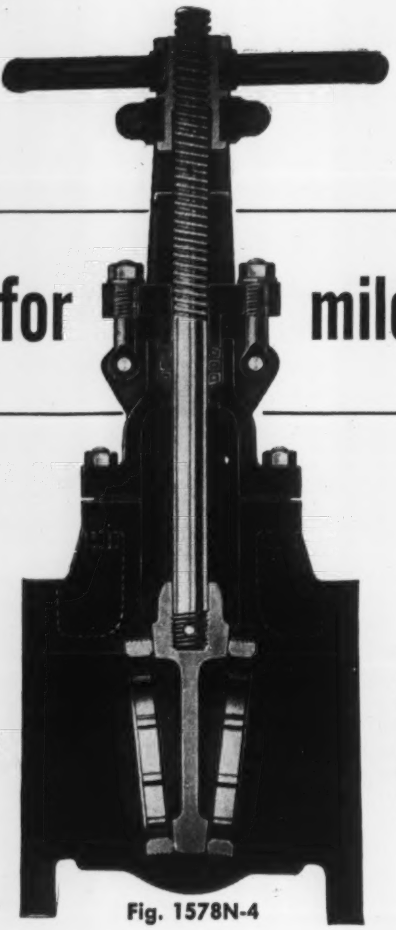

Fig. 1578N-4

3% Nickel Iron Gate Valve, Class 125 lb. . . . for process industries . . . developed and produced by The Lunkenheimer Co., Cincinnati 14, Ohio. Outside screw and yoke, bolted bonnet, flanged . . . face to face dimensions are American Standard for 125 lb. Cast Iron Wedge Gate Valves (ASA B16.10-1939).

LUNKENHEIMER develops new 125 lb. nickel-iron valve for process industries...

Mildly corrosive valve service poses a particularly tough problem in the process industries. To get *maximum* corrosion resistance, you have to pay for more than you need—high-alloy valves are expensive. And yet, ordinary cast iron often won't do the job.

An economical answer to many of these problems has been developed by Lunkenheimer with this new line of Nickel-Iron Gate Valves. Bodies and bonnets are 3% Nickel-Iron, for better corrosion resistance than ordinary cast iron, and trim is offered in choice of 18-8 (Type 316) Stainless Steel or Monel®, for maximum resistance at the point of most severe service. This combination is cutting valve costs in the petroleum field, pulp and paper, wood treating, and scores of other process industries.

This development is but one more instance that shows how nickel alloys can be used to provide significant advantages, whatever the equipment.

Many standard nickel alloyed compositions are available, making it easy to select one with extra qualities for almost any specific use. Whatever your industry, if you have a metal problem, send us details for our suggestions. Write today.

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET
NEW YORK 5, N. Y.

July 19, 1954

Impartial Umpire

Thus far in 1954 negotiations between spokesmen for employers and employees on the renewal of union contracts have been conducted with much less fanfare than in many, many years. While there have been some strikes, they have been fewer in number and of less bitterness than in any recent year.

At first glance, some observers may attribute this more tractable condition of collective bargaining to the somewhat less favorable economic situation throughout the nation. While unemployment is not alarmingly high, it is sufficiently serious in some industries and in some localities to act as a definite deterrent against impetuous strike action. Workers usually are not as ready to vote for a strike when jobs are scarce as when they are plentiful.

This reasoning is valid up to a certain point, but it falls short of explaining why important labor contracts are being negotiated so much more smoothly than they were several years ago. A factor far more important than the current economic situation is the role of the federal government in labor disputes.

Under the misnamed "new deal" and "fair deal" of Presidents Roosevelt and Truman, the accustomed strategy in labor disputes was for the government to horn in at the earliest opportunity, to set up "fact-finding" boards, and to engage in any activity that would throw the weight of government influence in favor of the union big shot who happened to be promoting the strike. If these one-sided measures proved ineffective, the government did not hesitate on two occasions to threaten to call out the military to operate trains and to seize the steel industry.

Today the administration in Washington is pursuing a neutral policy in labor disputes. It believes in giving both principals full latitude in bargaining collectively without undue kibitzing on the part of prejudiced government agencies. Even the short-lived atomic energy strikes at Oak Ridge and Paducah were settled with only a minimum of Washington attention.

This is as it should be. It is refreshing to see the government again in the role of an umpire who doesn't favor either side.

E. L. Shaner

EDITOR-IN-CHIEF

UPGRADE DISTRIBUTORS: An important article in this publication's 1954 Management Series is "Personnel in Distribution." If you take the time to read through the introductory paragraphs, you will be so thoroughly convinced of the possibility of actually saving cold cash by paying closer attention to the problems of the personnel in your company engaged in distribution activities that you will read the remainder of the article eagerly.

The major point in discussions of this subject is that if most companies would devote as much attention to the fine points of distribution as they have to those of production, they would reap benefits far beyond anything that thus far has been contemplated. There are 17 million people engaged in America's $100-billion distribution job—in selling, advertising, servicing, packaging, transporting and other activities to move goods from the point of manufacture to the point of sale.

That these 17 million have received less training, less study and research and less attention in many other respects than the people in production is a tremendous challenge to America's industrial executives.

* * *

TESTS TOUGHER STEEL: About 300 industry, military and technical-code authorities on June 29 and 30 were interested spectators (p. 102) at burst and impact tests on the grounds of Chicago Bridge & Iron Co. at Birmingham of a new steel—Carilloy T-1—developed by U. S. Steel. The tests were conducted on four large pressure tanks cooled to −45°F and coated with ice.

The new steel costs 2½ times as much as mild carbon steel but it is about three times as strong, its low temperature toughness is good, its atmospheric corrosion resistance is about two or three times as great, it has good weldability and can be gas-cut and cold-formed readily. It seems to be especially well suited for pressure vessel construction, but doubtless will be found desirable for other applications.

* * *

LOOK INTO BLASTING: Metalworking executives are conscious of the importance of industrial explosives largely because of their extensive use in the extraction of ore, coal and stone and in heavy construction work. However, improved explosives coupled with greatly refined blasting methods (p. 55) promise to expand industry's use of explosives sharply.

For instance, a company preparing a base for an exceptionally heavy machine struggled along for a week with a gang of men using jack hammers to dislodge shale and rock. Their progress was so slow that the contractor finally called in an explosives expert. He licked the job in a few hours one single afternoon.

The blasting experts have new techniques which permit them to control detonations without damage to nearby property. Executives who know the new skills of the explosives engineers are saving money.

* * *

COST-SAVING CURTAINS: Sometimes a spectacular stunt does an effective service in bringing to public attention a new product or process. A few weeks ago the people were informed by radio, television and press that in 9½ hours 61 workmen enclosed the skeleton of a 22-story building with prefabricated curtain walls. Under orthodox construction practice this enclosure would have required eight to ten weeks (p.62).

The new curtain walls, which hang from the structural frame of the building, come in sections one or two stories high, complete with windows, insulation and other appurtenances. They are of aluminum, stainless steel or porcelain enamel. Also, two layers of corrugated aluminum sheet with insulation between is becoming a popular choice for both industrial and office buildings.

It would be unwise to go completely overboard on these new developments, but they deserve careful consideration.

* * *

OXYGEN CONVERTED STEEL: Steelmakers all over the world are keenly interested in the development of oxygen converter steel. A typical blowing cycle consists (p. 110) of charging the converter with 29 tons of pig iron, 8.3 tons of scrap and 0.7 ton of roll scale to which is added 1.9 tons of lime. Into this is blown 2.4 tons of 95-per-cent-pure oxygen. After a 20-minute blow, about 35 tons of steel is poured. Tests show the oxygen converted steel to be equal in metallurgical qualities to that of open-hearth steel.

In undertaking to transfer this process from Europe to the United States, engineers are confronted with a serious problem of handling the dust and fumes emitted from the converter. Two cleaning systems are known which will meet existing air pollution codes, but they entail expensive equipment. In a new two-converter shop costing about $6,330,000, almost a million dollars of that cost is for fume controlling equipment. However, a comparable new open-hearth plant would cost $17,500,000.

(Advertisement)

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

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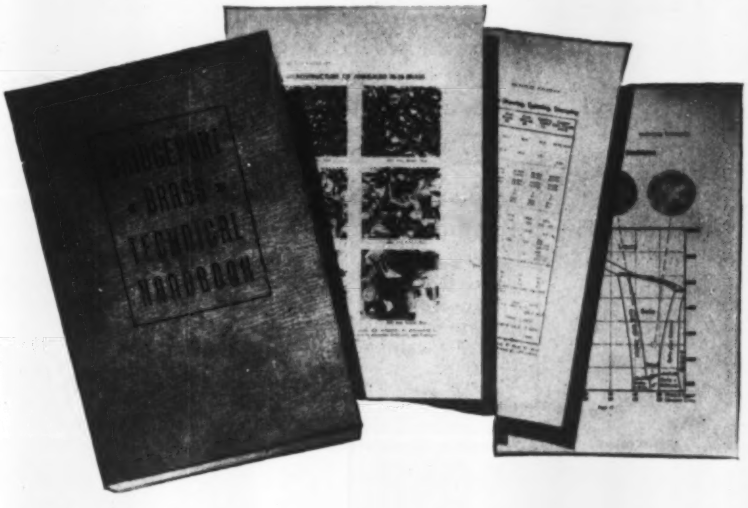

Bridgeport Technical Handbook

To Help Our Customers on Metal Problems

Mass production of tiny but precise metal parts for electronic equipment calls for exacting specifications in brass and copper mill products. The Bridgeport "Technical Handbook" is designed as a ready-reference for product engineers and those responsible for purchasing and fabricating copper and copper-base alloys.

Bridgeport Brass Company recognizes the importance of supplying metal of uniform high-quality for automatic operations. Close cooperation between the fabricator and our technical service department will quickly help with materials to answer performance requirements, cut wasted time and prevent excessive spoilage.

Simplifies Alloy Selection

The Bridgeport "Technical Handbook" is divided into logical, easily read sections covering both general information and specific engineering data.

The first section discusses the numerous coppers and copper-base alloys, their compositions, physical and mechanical properties and their uses. It covers in non-technical language such subjects as the copper-zinc alloy system; the effects of additional elements such as lead, tin, aluminum, silicon, manganese, iron, nickel and arsenic on coppers; and the effects of annealing on physical properties. Temper or degree of hardness for sheet, rod, wire and tubing is explained. The causes and prevention of stress corrosion, cracking and hot breaks are discussed.

In addition, the "Technical Handbook" contains information on the importance of the microstructure of rolled and annealed brasses, graphically illustrated by micrographs and curves.

Mill Product Shapes

The following three sections are devoted to mill products—strip and sheet, rod and wire, and tubing. They are further broken down into groups such as Brass and Copper Strip for Drawing, Spinning and Stamping; Rods for Screw Machine Operation; Wire and Rod for Cold Heading; Rods for Hot Forging; Tubing for Fabrication; and many others.

Each classification lists not only the alloys and their applications, but gives a table of Composition, Mechanical Properties, Physical Constants, Fabrication Properties, as well as the latest specification numbers. By referring to these tables, the purchasing agent and the design engineer can see at a glance the alloys available and their comparative properties. This simplifies alloy selection, saves time and effort.

Hints on Metalworking

The handbook contains a brief but authoritative outline of procedures for working copper-base alloys. There are many diagrams and tables relating to machining, the tools to be used and recommended coolants. Data on Milling, reaming, chasing and sawing are given in concise tabular form with suggested procedures for the different alloys discussed. There are also full sections on drawing and drawing lubricants, annealing, cold heading, soldering, cleaning and dip coloring.

Useful Appendix

To complete the Handbook, almost thirty pages of informative tables are included as an Appendix. These tables cover equivalent weights, temperature conversions, metal melting points, length measurement conversions, and weights of flat products, circles, rod, round wire and copper tubes.

How to Get Your Copy

The Bridgeport "Technical Handbook" is a reliable guide to many problems and situations met by purchasing agents, design engineers and production superintendents in every-day work with copper-base alloys. Your copy will be quickly mailed upon request on company letterhead. And if you are confronted with metal problems not completely answered in the Handbook, do not hesitate to contact our nearest branch office for assistance as well as for your metal requirements. (1593)

ANOTHER PART MADE RIGHT WITH INLAND **JOB-RIGHT** COLD ROLLED SHEETS

TOO TOUGH TO DRAW*–until Inland cold rolled sheet experience was put to work*

The designer of this streamlined, one-piece washing machine wringer shroud asked for an awful lot in performance from cold rolled sheet steel. So much, in fact, that the Chamberlain Corporation of Waterloo, Iowa, leading producer of wringer shrouds, couldn't find a steel to take this intricate draw without excessive breakage. Inland sales and mill men tackled the problem and licked it with a cold rolled sheet produced especially for this job.

Whether your part is tough or easy to make, Inland can produce a cold rolled sheet that's *job-right.* Our problem-solving experience and facilities may be able to help you too. Write today.

TOUGH TO MAKE. Says Purchasing Director, C. M. Sherrill of the Chamberlain Corporation (left): "Inland came up with *the* cold rolled sheet that could take the tough draw for this one-piece wringer shroud. The 7½" draw is made in one operation. Production performance of Inland sheets has consistently been better than anticipated . . . shipment after shipment."

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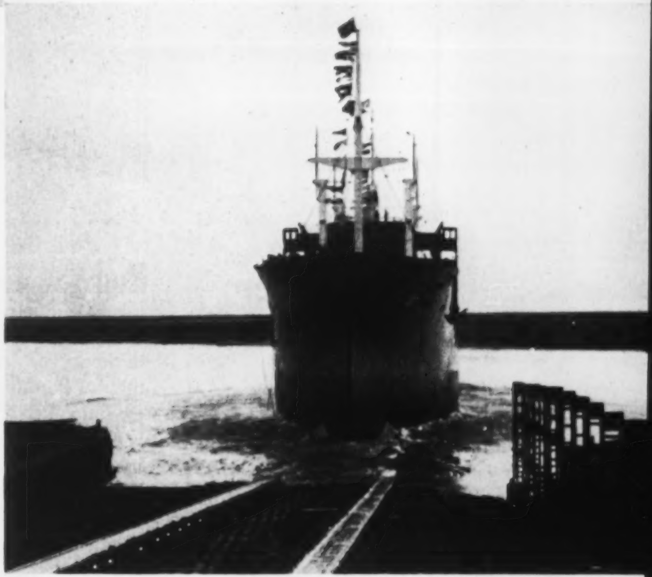
A STEEL survey indicates metalworking executives expect the last six months of 1954 to be 10 per cent better than the first. Stronger consumer demand, more defense spending, easier money and the end of the inventory shakeout are external factors. Internal factors that you can more closely control also account for anticipated gains. To learn more about those, STEEL went to the industry with the poorest prospects in the U.S. That's shipbuilding, keeping afloat despite its gloomy outlook. Its improvisations demonstrate how all metalworking is bailing itself out of recession.

With the last launching in sight . . .

Shipyards Bail Out With Diversification



Ingalls Shipbuilding Corp.

LIKE UNEMPLOYED sailors, shipyards may hustle a buck elsewhere, but they're always looking seaward for a chance to return to the water.

The last five of 35 mariner class boats are now under construction in the nation's coastal shipyards; when these are completed not a single ocean-going dry cargo vessel will be on an American shipway. Proposed legislation for more merchant ships may help, but it'll be a year before this is felt even if the program is pushed through Washington without the usual hurdles.

The Problem—Until then, coast shipyards, like the lake yards (see STEEL, June 14, p. 70), are hustling business in other fields. They not only have to keep as much equipment in operation as possible to maintain the equipment, but also they must keep their core of skilled forces, including engineers, employed to keep them from drifting away permanently.

Most shipyards are taking on new jobs they can handle with existing equipment; some are making new installations in their diversification programs. Major fields the shipbuilders are giving greater attention to are structural steel fabrication, weldments, heavy forgings, turbine casings, welded pipe, heavy valves and compressors, paper mill machinery and heavy crushing machinery. Heavy equipment built by the yards this year will probably exceed $75 million. But, even this amount of business is by no means a lifesaver and isn't the difference between remaining open and closing for lack of ship work.

Here's what they are doing:

Moore Dry Dock Co., San Francisco—In addition to increasing facilities for fabricating structural steel, this is one yard adding equipment for diversification which includes machinery for power plants, paper mills and metalworking industries. Moore also maintains an erecting department for bridges, building and large sign frames.

New York Shipbuilding Corp., Camden, N. J.—This yard produces large weldments for Lukens Steel Co., heavy forgings for Loewy Construction Co., turbine casings for Westinghouse Electric Corp., and turbine weldments for General Electric Co. Other work includes large diameter welded pipe, heavy weldments and structural steel.

Avondale Marine Ways Inc., Avondale, La. — Diversification amounts to about 10 per cent here with welding and structural steel fabricating for the chemical and petroleum industries taking up most of the volume.

Newport News Shipbuilding &

Dry Dock Co., Newport News, Va. —This yard has contracts for supercarriers of the Forrestal class, but is diversifying for commercial production of water power equipment, pressure vessels, large valves, wind tunnels, compressors and paper mill machinery.

Ingalls Shipbuilding Corp., Birmingham — Plate and structural steel fabrication accounts for most of the commercial volume here. Biggest markets are for plate work in the chemical and petroleum industries. Some subassembly work, including diesel engine blocks, is done too.

Bethlehem Steel Co., Quincy, Mass.—Heavy equipment is being produced, and subassembly contracts for power equipment, paper mill digesters, large weldments, water distilling equipment and turbines are held.

Bath Iron Works, Bath, Me.—It purchased the Pennsylvania Crusher Co. and is producing heavy crushing machinery for it.

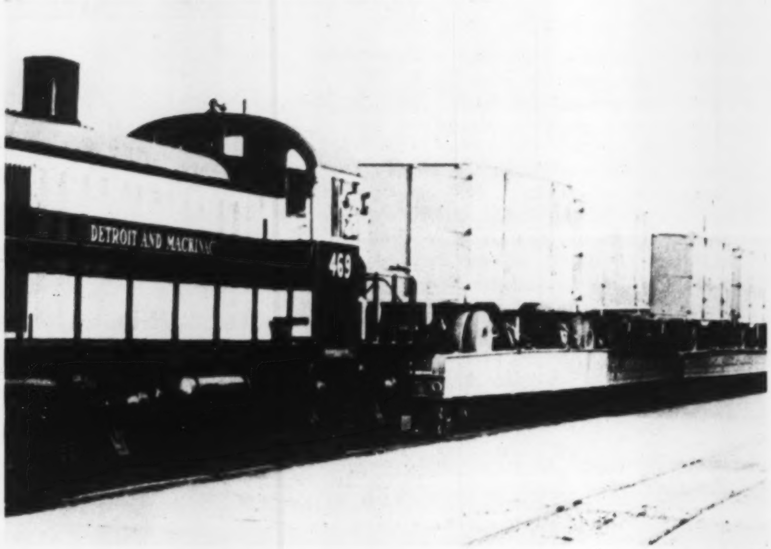
Electric Boat Division, General Dynamics Corp., Groton, Conn.—This is the only private yard producing submarines, including atomic powered subs. Electric Boat has two subcontracts from Blaw-Knox for atomic energy projects at Oak Ridge, Tenn., and Hanford Works, Washington. Other markets served include aircraft, chemical, petroleum, petrochemical and food processing industries. Directly after the war, Electric Boat went into steel bridge fabrication and erection.

Mr. Metalworking

William A. Prentiss: Mr. Metalworking of 1954.

That's STEEL's nomination for probably the oldest steel executive in the nation. Mr. Prentiss, president of George W. Prentiss Co., Holyoke, Mass., celebrated his 100th birthday July 10. He is the oldest living graduate of Massachusetts Institute of Technology.

The company, a wire manufacturer, was formed in 1857 by Mr. Prentiss' father.



NEA

Highball for Piggy Back as ICC Changes Its Mind

LESS THAN a month after one division of the Interstate Commerce Commission suspended piggy-back tariffs of six eastern railroads, the full commission reversed that decision on July 9. The six eastern roads will be allowed to inaugurate their proposed services pending further investigation.

The Pennsylvania; Erie; Delaware, Lackawanna & Western; and New York, Chicago & St. Louis (Nickel Plate) were ready to begin service last week. The Baltimore & Ohio is to begin service this week (July 20). The Wabash will be ready for such service soon.

ICC Streamliner—What the ICC has done is to allow the railroads to show what they can do with piggy-back service. It has not dropped all questions regarding piggy-backing. A July 27 meeting on the new tariffs will be held as scheduled.

Surprise was registered in many quarters that the ICC acted so quickly on the proposed tariffs. Several reasons were forwarded. One is that the ICC has had a change of heart and is ready to act quickly and boldly to help transportation groups meet today's competitive conditions. Another reason is that railroads have already ordered valuable equipment that was held up. Also, much equipment had already been modified and was idled by the order.

Among the First—The Erie already had customers lined up for its piggy-back service in June before the ICC suspension. Among the shipments scheduled was one 33,000-pound shipment of copper tubing and a 25,000-pound shipment of chemicals. Last week there was a good chance that these shipments would be among the first piggy-back loads of the Erie.

ICC's about-face means two things: Fuller use of our transportation facilities and the opportunity for more equipment orders.

Aluminum Forging Goal Set

Aluminum forging capacity of 504,150,000 pounds annually to be attained by Jan. 1, 1956, is the interim expansion goal announced for the industry by Office of Defense Mobilization. That would be an increase of 108,250,000 pounds, or 27 per cent, over the capacity in existence on Jan. 1, 1954.

The government will grant accelerated tax amortization for the facilities, which will be divided as follows: Medium forging presses—expansion of 13.9 million pounds of forgings; upsetter forging presses—17.6 million pounds of expansion; large forging presses—76.8 million pounds of expansion.

Merge and Diversify?

Proposed Studebaker-Packard Corp. may diversify to make appliances as well as autos

WHEN PACKARD and Studebaker don their big league uniform after merger approval, the new auto giant may wield more than a bigger car-producing bat to increase its hitting power.

Hint of diversification in the new company was contained in the proxy statement mailed to stockholders. Merger approval meetings by the companies are scheduled for Aug. 17.

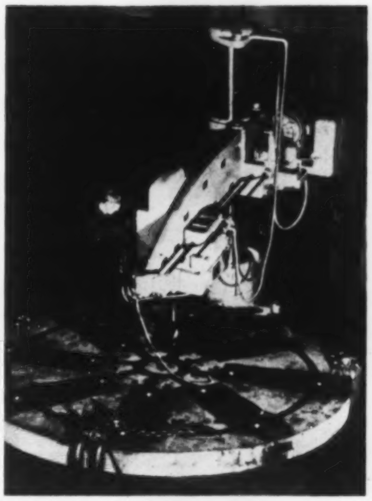
The Bets—Speculation of the diversification—particularly in the appliance field—is strengthened by these factors: 1. Competition in the auto market is particularly keen and diversification would provide the new company with a stabilizing factor, and 2. James J. Nance, Packard president who will head the new company, knows the appliance business as well as the auto business. He was formerly president of General Electric Co.'s affiliate, Hotpoint Inc.

Merger approval by the stockholders will make the Packard-Studebaker firm the fourth auto company to offer a complete line of cars; GM, Ford Motor Co. and Chrysler Corp. are the others.

Capital — Proxy statements by the two companies disclosed that the working capital of the two firms as of April 30, 1954, was $87 million. If the proposed revision of the federal internal revenue code is enacted the figure would be raised to about $91 million.

Stockholders were also told that Packard automatic transmission facilities could be expanded to cover Studebaker transmissions. The Studebaker assembly plant in Los Angeles could also be enlarged to accommodate Packards, and it was pointed out that the operating and manufacturing facilities of the two companies complement each other to a considerable degree.

Another big advantage in the merger stressed by Packard's Mr. Nance and Harold S. Vance, Studebaker president, is in marketing. Studebaker now has about 2500 dealers and Packard 1200. Under the new company, these would be combined with each dealer carrying both lines of autos. Ultimate goal is to have representatives in 4000 marketing areas.



Cutter-Upper

New set of teeth for a rayon woodpulp mill is nearly a foot thick and 12½ feet across. Lukens Steel Co., Coatesville, Pa., rolled the chopper

GE: New Bait for Buyers

New policies are designed to level sales peaks and valleys in heavy equipment

GENERAL ELECTRIC CO. is dangling more appetizing bait before its customers in an effort to level off sales peaks and valleys of heavy generating equipment business.

Business today is off—Glenn B. Warren, vice president and general manager of GE's turbine division, says backlogs today are about equal to the manufacturing cycle of 18 months; in 1951 the backlog was 36 months.

New Policy—Pointing out that the utility industry is falling behind the growth and expansion estimates of Edison Electric Institute, GE has inaugurated a new policy to stimulate sales. Chief factors are:

1. GE on large orders will go ahead with initial engineering and manufacturing on the understanding that the customer may cancel within six months and "pay only a minimum amount of the contract price." 2. GE will work out financing help on charges normally made before shipment until other financing can be handled through normal channels by the customer.

There's Interest—The new policy is designed to tempt any wavering company who is contemplating expansion. Even though new orders at GE are running at a rate of about one-third of finished product shipments, Mr. Warren reports a good increase in propositions being investigated by the utilities.

According to the GE executive, the next month or so will determine the peak summer loads for the nation's utilities and will have a direct bearing on their long-range plans for increasing capacity in the next two to five years.

The Potential — EEI statistics indicate a doubling of demand for electric power in the next 12 years. By 1975 the peak load may be even three or four times greater than last year's 81.6 million kilowatts, EEI believes.

Electrical Output Climbs

Production of electricity is still going up, although not as fast as it was a year ago. High residential consumption is making up for lowered industrial use.

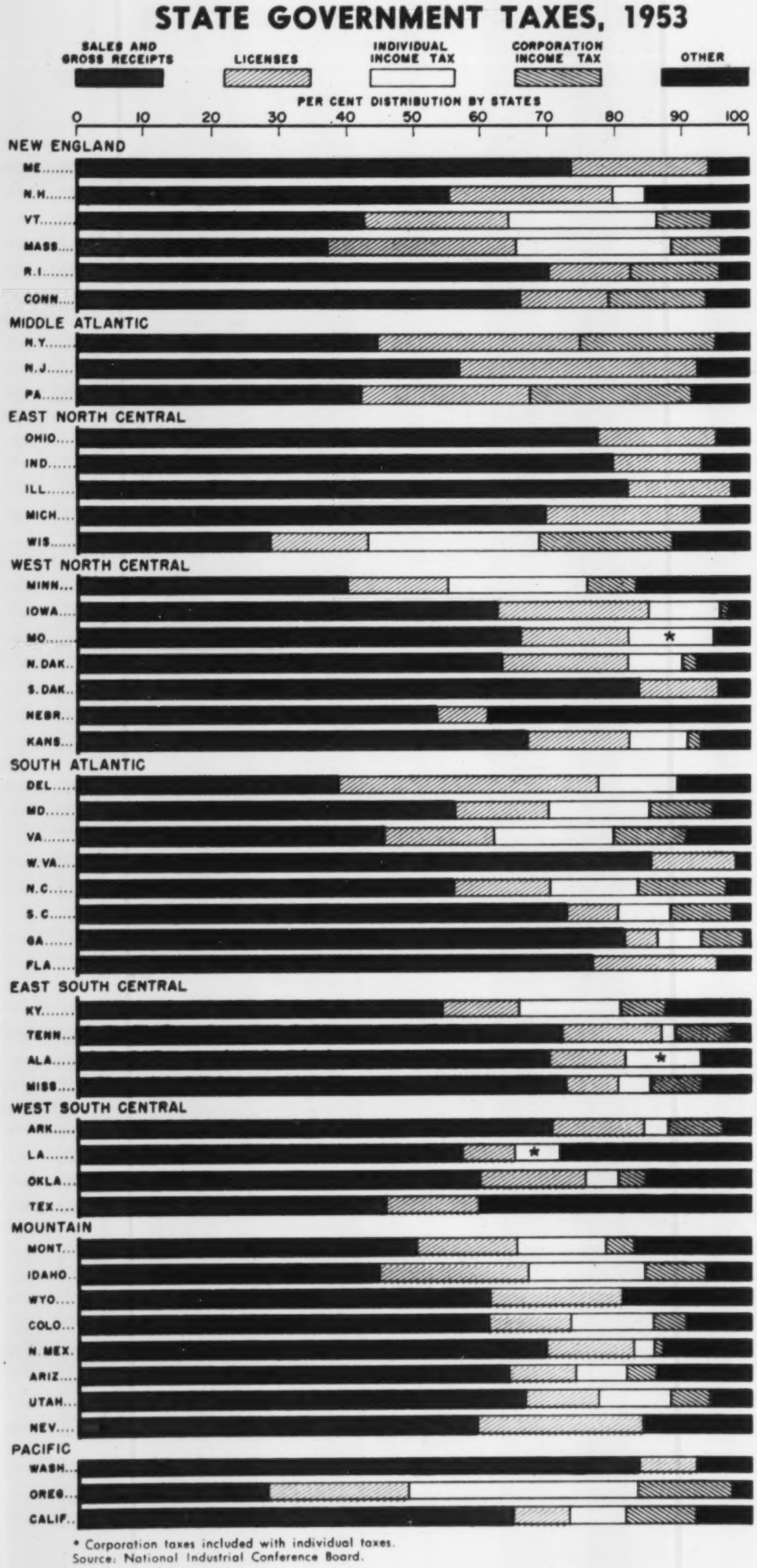
Output for first half, 1954, is about 5.3 per cent above that of the same period a year ago when 215.7 billion kilowatt-hours were produced. First half, 1953, showed an 11.4-per-cent gain over the like period in 1952.

More Titanium in Prospect

The nation's titanium sponge production capacity will be increased 1800 tons a year after completion of an addition to Dow Chemical Co.'s Midland, Mich., facility.

Under a contract signed by Dow and General Services Administration, titanium production at Midland will reach 1½ tons per day by early 1956 and 5 tons a day by July of that year. Present capacity is only about 600 pounds a day, partly because of continuing experimentation. Dow uses a magnesium reduction process in producing sponge.

State Taxes on Business: The Load Grows Heavier



* Corporation taxes included with individual taxes.
Source: National Industrial Conference Board.

Corporate levies vary widely. Look before you leap into another state

TAKE A LOOK at the accompanying table on state tax sources if you are considering a new home or a new plant in another state.

Pennsylvania, Massachusetts Wisconsin, California, New York and Connecticut lead among heavily industrialized states in their receipts from corporate income levies. Ohio, Indiana, Illinois, Michigan and a few other industrial states don't have corporate taxes, but they do have license and property levies which hit industry.

The Score—The 48 states in 1953 collected $10.6 billion in taxes, reports National Industrial Conference Board. California led with $1142 million, followed by New York, $1120 million; Pennsylvania, $595 million; Michigan, $582 million; Illinois, $514 million; Ohio, $492 million; Texas $447 million and Massachusetts $322 million.

Sales and gross receipts taxes, including "licenses" at more than nominal rates, are based on volume or value of transfers of goods or services, upon gross receipts therefrom or upon gross income. Related taxes in that category are based upon use, storage, production (other than severance of natural resources), importation or consumption of goods.

Licenses are all taxes exacted as a condition to the exercise of a business privilege other than those levied at more than nominal rates. Licenses include fees related to licensing activities—automobile inspection, gasoline and oil inspection, professional examinations.

Individual income taxes are measured by net income and on special types of income, such as interest, dividends, etc.

Corporate net income taxes are on both net income and on specially defined income.

Other taxes include levies on property, deaths and gifts, poll, documentary and stock transfers and severance (taxes imposed on removal of natural products, such as oil and gas, from the soil). The severance tax is a particularly important source of revenue for Texas, Oklahoma and Louisiana.

INDUSTRIAL BLASTING POWER GOING SKY-HIGH

Consumption of Explosives

1935-1939 average	364,659,632 pounds
1952 • • • • • • •	764,718,364 pounds
1953 • • • • • • •	790,810,690 pounds

Hamilton Wright

Headed for Another Bang-up Year

Explosives

FOR AT LEAST ONE INDUSTRY, 1954 will be a boom year. Industrial explosives makers point out that in 1953, industry blew up a record-breaking total of 790.8 million pounds of the material, an increase of about 3 per cent over the previous high of 764.7 million pounds in 1952. Despite the lull in the first half of this year, most producers will agree with W. E. Collins Jr., director of sales for Atlas Powder Co., Wilmington, Del., who says, "We look for continued high sales during the present year."

Takes Up the Slack—Usage of high explosives adds up to at least $100 million annually, estimates Norman P. Alexander, vice president of Austin Powder Co., Cleveland. Increased applications in construction, quarrying and mining have doubled demand for industrial explosives since 1940. As coal mining uses dip, construction and quarrying continue to take larger slices of high explosives shipments.

In 1953, for instance, railway and other construction accounted for 23 per cent of all industrial explosives, an increase of 12 per cent over the previous year. On the other hand, G. H. Loving, director of high explosive sales at E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., says, "Major mining companies are our leading customers." But that lead is decreasing, having dropped from 35 per cent of all exposives used in 1952 to 32 per cent for 1953. Metal mining used 21 per cent of the total last year, a good increase of 11 per cent over 1952, according to the Bureau of Mines.

Cost-Cutting Possibility—"Mining, quarrying and construction industries are continually searching for new methods and machinery to reduce costs, but they often miss chances by overlooking blasting," say officials of Hercules Powder Co. Inc., another large Wilmington producer. An example of saving costs through blasting is found in Cleveland, where a company, digging a machinery base foundation, had hacked into rock with air hammers for a week with little success. A blasting expert cleared out the rock in one afternoon with explosives.

Modern techniques enable companies to do this without damage to plant and equipment. Blasters have developed charges which may be fired at controlled delay intervals as short as a thousandth of a second. Fine fragmentation of rock and a minimum of vibration follow a succession of closely coordinated charges, they say. A Pittsburgh construction firm claims this not only allows faster digging but also the reduced vibration and noise make possible blasting operations closer to other buildings than had been possible formerly. Blasters are now using sequence photography to study explosive action further.

Hand in Hand—While blasting methods are being improved, so are the explosives themselves. "The biggest advance in industrial explosives in recent years has been the increased use of ammonium nitrate," says Mr. Loving. "The customer now gets more explosive strength for his dollar than he ever before received."

Big Business: Big Buyer

The 100 largest manufacturers last year bought $48 billion worth of goods and services, not counting wages. They had peak sales of $91.4 billion

LAST YEAR the country's 100 largest manufacturers paid out $48 billion for goods and services, not counting wages and salaries, notes the National City Bank of New York.

The record purchases of the top 100 were over half again as large as the Department of Defense's current budget, excluding personnel pay.

Standards — The accompanying list of the top 100 is based on total assets. At the end of 1953 they ranged from $215 million for Colorado Fuel & Iron Corp. to $5.4 billion for Standard Oil Co. (N. J.). Of the 100 largest, 46 are metalworking firms. Another 11, such as the rubber and chemical companies, are in many metalworking activities or operations closely related to metalworking. Ford Motor Co. is one of the top 100, but it's not included because the last public report on its assets, $1.8 billion, was Dec. 31, 1952.

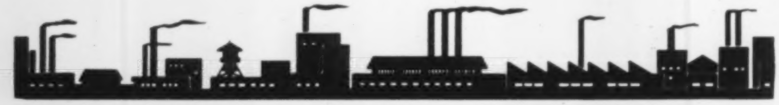
Total assets for the 100 listed is $31.6 billion. Total employment was about 4.7 million. Thus, those firms have an investment of about $15,000 per employee. It averages $4500 for the largest aircraft companies, $7000 for rubber, $8000 for electrical equipment, $8000 for autos and parts, $9000 for food products, $11,000 for machinery, $12,000 for steel, $13,000 for textiles, $18,000 for nonferrous metals, $20,000 for chemicals, $41,000 for petroleum.

Sales—Last year the top 100 had total receipts aggregating $91.4 billion from sales and other operations—5.3 times the total in 1939. Wages, salaries and labor benefits cost the largest companies 24.9 cents per sales dollar. Total federal, state, local and foreign taxes cost 12.1 cents for every sales dollar. Net income after taxes totaled $5.7 billion, or 6.2 cents per sales dollar. Cash dividends hit $3 billion, or 3.3 cents per sales dollar.

The remaining earnings of $2.7 billion, or 2.9 cents per sales dollar, were retained in the business to help pay for capital expenditures and to build current assets. Capital outlays totaled $6.4 billion for the 100 largest companies, against depreciation charges of $3.7 billion, leaving an increase of $2.7 billion in the net property account. Working assets were also increased by $1.8 billion, making the gain in total assets $4.5 billion.

More Indebtedness — To finance that total required not only the entire retained income of $2.7 billion but also an increase in indebtedness of $1.6 billion, plus $200 million from new stock issues and surplus adjustments.

So, although the 100 largest industrial businesses had record sales last year, they had to end up by borrowing more money, primarily because of heavy plant expansions and modernizations.



100 Largest Manufacturers at End of 1953

(Total assets in millions after deducting reserves for depreciation)

Allied Chemical & Dye Corp.	$703
Allis-Chalmers Mfg. Co.	402
Aluminum Co. of America	906
American Can Co.	432
American Cyanamid Co.	443
American Smelting & Refining Co.	364
American Tobacco Co.	801
American Viscose Corp.	268
Anaconda Copper Mining Co.	836
Armco Steel Corp.	465
Armour & Co.	474
Atlantic Refining Co.	571
Avco Mfg. Corp.	223
Bendix Aviation Corp.	329
Bethlehem Steel Corp.	1,783
Boeing Airplane Co.	232
Borden Co.	296
Borg-Warner Corp.	260
Burlington Mills Corp.	301
Caterpillar Tractor Co.	261
Celanese Corp. of America	322
Chrysler Corp.	898
Cities Service Co.	1,103
Coca-Cola Co.	236
Colorado Fuel & Iron Corp.	215
Continental Can Co.	321
Continental Oil Co.	409
Crown Zellerbach Corp.	243
Deere & Co.	431
Distillers Corp.—Seagrams	458
Douglas Aircraft Co.	274
Dow Chemical Co.	769
E. I. du Pont de Nemours & Co.	1,846
Eastman Kodak Co.	524
Firestone Tire & Rubber Co.	567
Food Machinery & Chemical Corp.	223
General American Transportation Corp.	226
General Electric Co.	1,697
General Foods Corp.	353
General Motors Corp.	4,405
B. F. Goodrich Co.	437
Goodyear Tire & Rubber Co.	666
Gulf Oil Corp.	1,766
Inland Steel Co.	433
International Business Machines Corp.	520
International Harvester Co.	973
International Paper Co.	507
Jones & Laughlin Steel Corp.	579
Kaiser Aluminum & Chemical Corp.	320
Kaiser Steel Corp.	267
Kennecott Copper Corp.	748
Liggett & Myers Tobacco Co.	497
Lockheed Aircraft Corp.	260
Mathieson Chemical Co.	260*
Monsanto Chemical Co.	362
Philip Morris & Co.	255
Nash-Kelvinator Corp.	233†
National Dairy Products Corp.	425
National Distillers Products Corp.	422
National Lead Co.	295
National Steel Corp.	528
Ohio Oil Co.	313
Owens-Illinois Glass Co.	222
Phelps Dodge Corp.	345
Phillips Petroleum Co.	1,039
Pittsburgh Plate Glass Co.	442
Proctor & Gamble Co.	444
Pullman Inc.	229
Pure Oil Co.	383
Radio Corp. of America	494
Republic Steel Corp.	741
R. J. Reynolds Tobacco Co.	599
Reynolds Metals Co.	432
Richfield Oil Corp.	262
Schenley Industries	414
Shell Oil Co.	985
Sinclair Oil Corp.	1,141
Singer Mfg. Co.	405
Skelly Oil Co.	275
Socony-Vacuum Oil Co.	2,154
Sperry Corp.	259
Standard Oil Co. of California	1,535
Standard Oil Co. (Ind.)	2,036
Standard Oil Co. (N. J.)	5,372
Standard Oil Co. (Ohio)	296
J. P. Stevens & Co.	257
Sun Oil Co.	469
Swift & Co.	533
Texas Co.	1,805
Tide Water Associated Oil Co.	362
Union Carbide & Carbon Corp.	1,191
Union Oil Co. of Calif.	476
United Aircraft Corp.	298
U. S. Rubber Co.	489
U. S. Steel Corp.	3,248
Western Electric Co.	877
Westinghouse Electric Corp.	1,265
Weyerhaeuser Timber Co.	323
Wheeling Steel Corp.	234
Youngstown Sheet & Tube Co.	514

Source: National City Bank of New York.

Ford Motor Co. and United Fruit Co. are not included above because they do not publish detailed income reports.

* To merge with Olin Industries, Inc., as Olin Mathieson Chemical Corp.

† Merged with Hudson Motor Car Co. as American Motors Corp.

GSA Seeks Homes for Elephant Tools

Defense users are asked to lease large machine tools for possible nondefense use. Dismantling, storing and installation costs in future emergency would thus be saved

INDUSTRY is being asked to help the government find peacetime homes for government-owned elephant machine tools nearing the end of their current defense work. The government's plan is to leave them in the plants where they are now set up on a lease basis with the added incentive of making them available for nondefense usage where that's possible.

The elephant tools—big planers, horizontal boring, milling and drilling machines, and big vertical milling machines—are essential to defense mobilization plans but have limited peacetime uses. Installing them in operating positions costs thousands of dollars. Dismantling and storing them would add another sizable cost to the taxpayers' burden.

Go Along — Thus machine tool builders, though opposed to leasing of government-owned tools for nondefense use, are acceding to the government plan in these special cases. Machine tool builders add that they don't expect to use these large tools more than two or three days a month on nondefense production.

General Services Administration has requested the Office of Defense Mobilization for permission to lease 97 elephant tools to 49 machine tool builders in whose plants they are located. So far only one case has been acted on. That's Medart Co.'s lease of two large tools. Action in the other 48 cases has been deferred until those companies complete their defense contracts.

Other Requests—Another recent request to ODM from the Navy calls for approval of a lease to Crylon Steel Corp., operating at the Kearney Reserve Shipyard, Kearney, N. J. That request specifies renewal of the lease of a small number of large tools and lease of two additional large tools which were used on defense work. It is expected the lease will be approved on the ground that the tools should be left in their present location as part of the mobilization readiness base.

No action has been taken on the request from Brown & Root Inc., Houston, for a lease permitting use on nondefense work of about $9-million worth of tools and accessory equipment installed at that company's plant to make tank parts. The application is regarded as dead.

Congress Ups Appropriation

At least one phase of government construction work in fiscal 1955 will continue at its present high tide mark as the result of congressional appropriation of $436,379,100 for civil works functions of the Army Corps of Engineers. That compares with $423,186,600 appropriated in fiscal 1954.

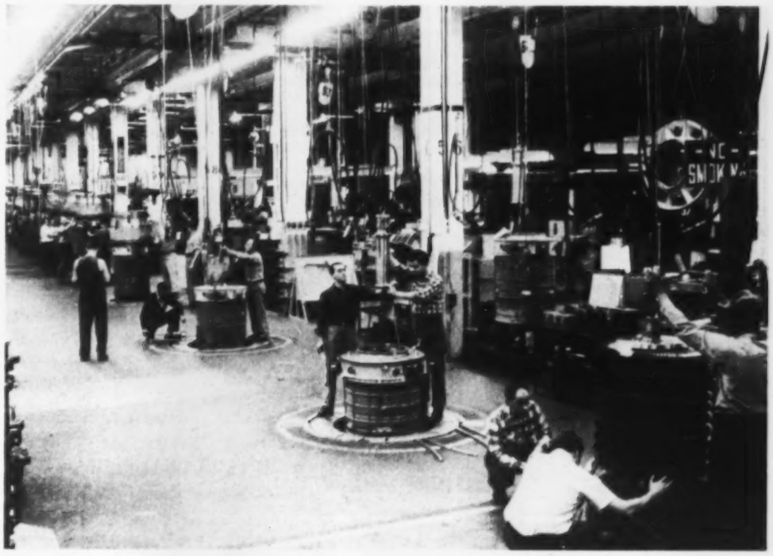
The funds are for multiple purpose, flood control and river and harbor progams assigned to Army engineers. Construction and planning work receives 76 per cent of the total, or about $333.2 million. The largest amount going to any one area is $96.9 million for the Columbia river basin, followed by $71.8 million for the Missouri river basin. Largest amount for a single construction project is $36 million for the Dalles Lock and Dam in Oregon and Washington.

NLRB Decision Favors Union

If the union representing your workers asks for a complete list of employees and their individual wage rates, you are obliged to furnish that information. So says the National Labor Relations Board by a vote of 4 to 1.

The decision made by the predominantly pro - administration board confirmed previous decisions handed down by the Truman-controlled group. It held that the union does not have to show specific need for the requested data. It is sufficient that the information sought "is related to issues involved in collective bargaining."

NLRB ruled in another case that the representative status of a union certified by the board may be challenged by a rival union within a year after the certification if the former's contract expires or is subject to renewal within that year.

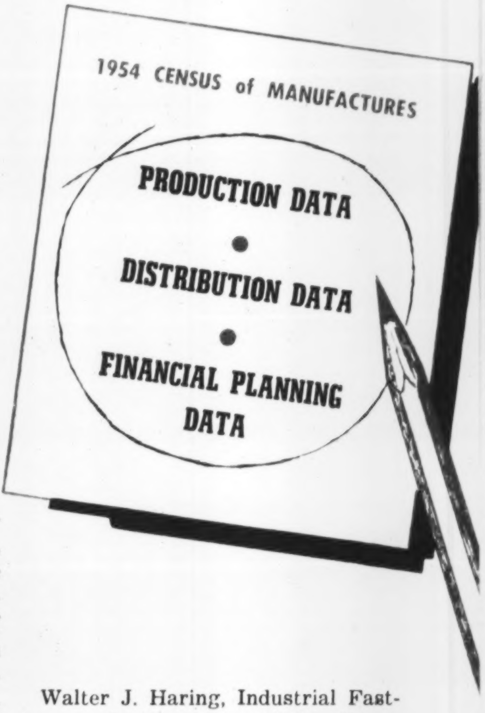


Turbojets for Another New Fighter

The Lockheed F-104, new high-speed day fighter for the U. S. Air Force, will be the sixth military aircraft to use the Curtiss-Wright J-65 jet engine, Curtiss-Wright Corp., Wood Ridge, N. J., has announced. Shown in final assembly, above, the J-65 turbojet engine develops a guaranteed rating of 7220 pounds of thrust

By E. C. KREUTZBERG *Washington Editor*

Industry Sharpens Questions for 1954 Census of Manufactures



INDUSTRIALISTS who have been working for two years on plans for the next Census of Manufactures are nearing the end of their labors. Theirs has been the job of helping decide what information should be brought out by this census and what information industry can provide.

These businessmen and a group of top government statisticians are to meet in Washington this week (July 20) to thrash out the more preplexing questions. Following this meeting, the industrialists are to finish up their work by Thanksgiving Day so that questionnaires may be printed for mailing. Questionnaires will go out to industrial firms next year for the 1954 Census of Manufactures.

Broad Aim—It's too early to say what questions will be asked in the forms. However, the broad objective is a maximum collection of factual data usable by private industry in production, distribution and financial planning, and by the government in its diversified operations.

Businessmen are looking forward to the 1954 Census of Manufactures because the last time such a census was taken under peacetime conditions was in 1940 on 1939 operations. The 1947 census was taken during a conversion from wartime to peacetime economy. A lot of water has flowed under the business bridge since then. Hence there are big gaps in this statistical field which need to be filled.

Industry's Team . . .

Participation of industrialists in planning the 1954 census began with the committee of businessmen headed by Ralph J. Watkins, which was appointed by Commerce Secretary Sinclair Weeks in October, 1953, to study the work of the Census Bureau. Reporting in February, 1954, the Watkins committee made numerous recommendations for the next Census of Manufactures. Particularly it stressed that the Bureau of the Budget call on its Advisory Council on Federal Reports to draft a plan for making the census adequate for the needs of industry.

The council thereupon appointed a Committee on the Census of Manufactures with Ted E. Veltfort, Copper & Brass Research Association, as chairman. A working subcommittee, with S. M. DuBrul, General Motors Corp., as chairman, was then set up and it's that working group that is calling the meeting this week.

Revising the SICs . . .

The Advisory Council on Federal Reports also recognized the need for revision of the government's Standard Industrial Classification Manual, which defines the groups for which statistics are shown. Last issue of the manual came out in 1945. So the council appointed 27 committees to review the manual and bring the definitions of industries up-to-date.

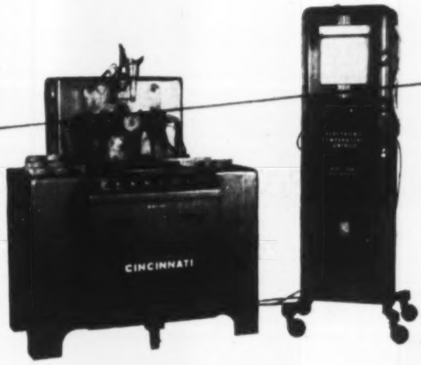
Committee chairmen for metalworking groups include: Horace Stringfield, U. S. Steel Co., for Major Group 33—Primary Metals; Walter J. Haring, Industrial Fasteners Institute, for Major Group 34 — Fabricated Metal Products (except ordnance, machinery and transportation equipment); Charles Stewart, Machinery & Allied Products Institute, for Major Group 35—Machinery (except electrical); D. C. Hooper, Westinghouse Electric Corp., for Major Group 36—Electrical Machinery, Equipment and Supplies; and John B. Hulse, Truck-Trailer Manufacturers Institute, for Major Group 37—Transportation Equipment.

No industry committee was appointed for Major Group 19—Ordnance and Accessories, since it was felt this should be left to the government. For disposing of intercommittee conflicts, a co-ordinating committee was created with Mr. Stringfield as chairman.

It is estimated that 400 to 500 businessmen and trade association executives have taken an active part in this planning work.

Double-barreled Benefit . . .

Planning the 1954 Census of Manufactures is a good example of the co-operation possible between businessmen and government. The results should be a better-than-ever census for both business and government.



yesterday

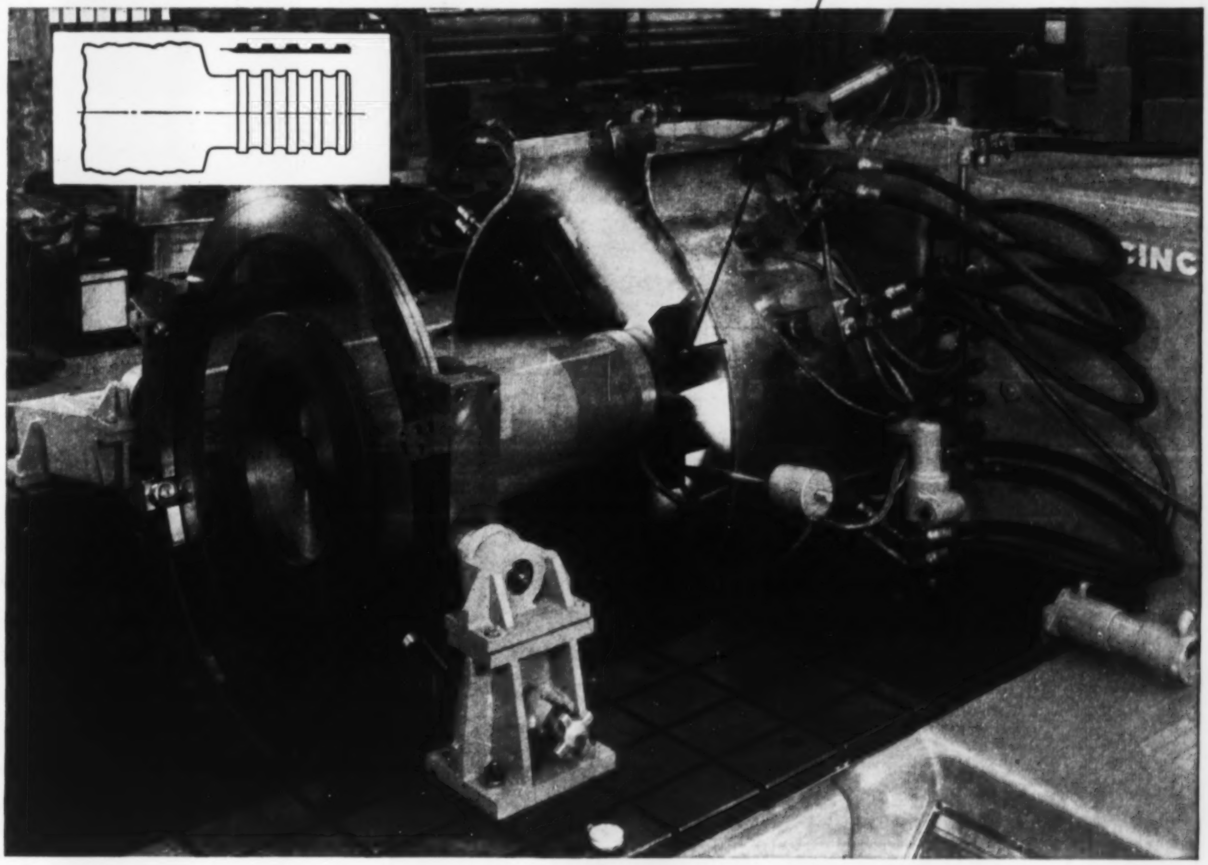
It's a far cry from the working model of the early Cincinnati Flamatic hardening machine shown at left to the "do-the-impossible" machines being run off today in the Flamatic Heat Engineering Laboratory. While the early machine hardened small gears in actual production and (among other things) helped to break a critical bottleneck in production of automatic 90 mm. gun loaders . . .

today

. . . one of Cincinnati's latest Flamatics (below) is hardening ball retention raceways in the assemblies for mounting propeller blades to go on aircraft we can't talk about. Races must be surface hardened to rigid specifications, before bearings are installed in the large assemblies. The work holding fixture by itself is quite a masterpiece. While Flamatics are getting bigger and more versatile, the original principles still apply: concentrate heat, control temperatures and confine hardness.

what's new

in flamatic selective surface hardening



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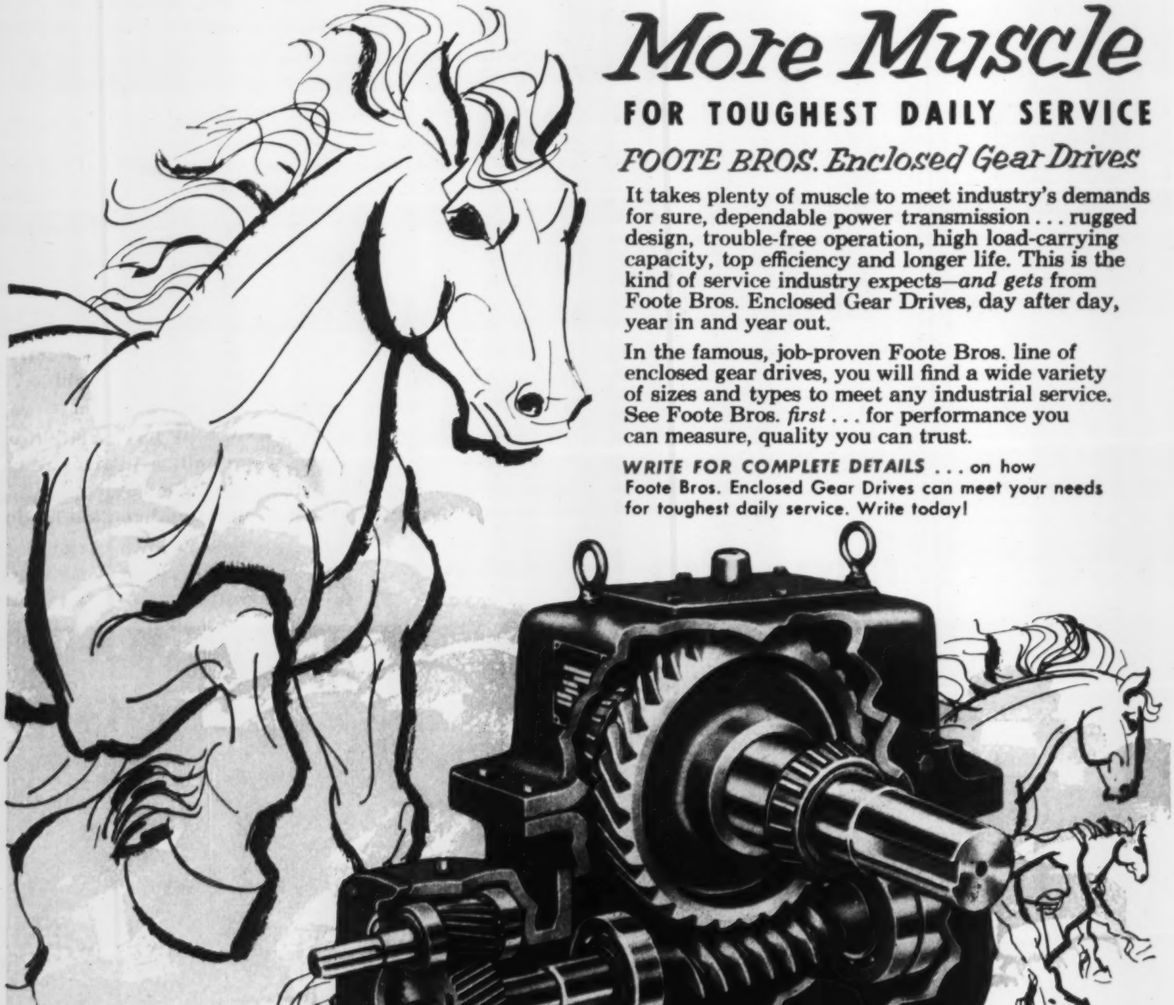
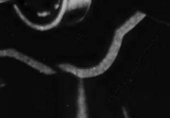


HYGRADE DRIVES

Horizontal and vertical types. Vertical available in Hytop design with long, unsupported output shaft extension. Single, helical-worm (illustrated) and double-worm reductions in ratios up to 4108 to 1; capacities up to 260 h.p.



MAXI-POWER DRIVES

Compact housings, specialized heat-treatment for gearing and improved accuracy of gear tooth generation mean longer, trouble-free performance. Ratios up to 360 to 1; capacities up to 1550 h.p.

LINE-O-POWER DRIVES

Incorporate higher capacity, space saving, longer life *Duti-Rated Lifetime Gears.* Available in double and triple reductions with ratios from 5 to 1, up to 238 to 1; capacity range from 1 up to 200 h.p.

FOOTE BROS.

Better Power Transmission Through Better Gears

Manufacturers of Duti-Rated Lifetime Gears, standard gears, enclosed gear drives of all kinds, gear motors, aircraft-quality gears and actuators, and special machinery . . . the world's finest since 1859.

FOOTE BROS. GEAR AND MACHINE CORPORATION • 4545 SOUTH WESTERN BOULEVARD • DEPT. X • CHICAGO 9, ILLINOIS

Management at Work

Moffett

The R. J. Wean Story: Service the Central Theme

ON JUNE 28, 1929, a young man started in business for himself in Warren, O.

The times seemed ripe for the action. The auto industry was well on its way to producing the sensational 4,587,400 cars it turned out that year. Steelmakers had already poured half of the phenomenal 63,205,490 tons of ingots they were to make in 1929.

Cincher—That volume of steel output convinced R. J. Wean of the need for his new Wean Engineering Co. Inc. as a specialist in sheet, tin and strip mill equipment. And he was right—despite the stock market crash that came soon after he started and the depression that followed.

"The hard times can offer greater opportunities than the good," says Jack Wean. "In a slump a company is often more willing to spend on new equipment to cut costs. The depression years were, relatively, the best years we ever had."

Story Pattern—The Wean story reads like a Horatio Alger novel: Newspapers at $2.50 per week, boiler shop at 10 cents per hour, grade and night schooling, journeyman patternmaker, money saved and a scholarship won to enable a course at Carnegie Tech where he was graduated with honors in 1917. In college he helped support himself by selling subscriptions to STEEL, then called *Iron Trade Review*.

After college he spent 12 years with engineering firms in technical and sales activities. On his own he developed a combination system to mechanize old sheet mills. Later the core of Wean Engineering's business was the devising of facilities to meet the wide strip-rolling requirements.

Operating—Wean Engineering has had jobs all over the world. "We get them through service," says Jack Wean. Thanks partly to his son and right hand, R. J. Wean Jr., an aviation enthusiast, the Wean enterprises are geared to air travel to provide that service faster.

For the Future—"Think a decade ahead about your industry's needs," Jack Wean says. He's engaged in a study to determine where nuclear energy can be applied to steelmaking, how ore concentrates may be best used in the blast furnace, how a zinc-titanium coating may be used commercially.

Jack Wean spends most of his time directing research and studying potential requirements of customers. "In essence, I am serving customers," he says. "Operate that way, and you can't go wrong no matter what the economic conditions."

Wide World

Aluminum curtain walls of this skyscraper shot up in one working day

Tishman Realty & Construction Co. Inc.

Up go prefabricated curtain wall panels. No trowel and brick work here

Equitable Life Insurance Co.

Smaller panels make fast work too. These panels are of stainless steel

Consider the Curtain Walls . . . How They Grow!

IN JUST nine and one-half hours 61 workmen recently enclosed the skeleton of a 22-story skyscraper. Without metalworking's latest boon to construction, the metal curtain wall, the same job would have taken eight to ten weeks.

The secret: Metal curtain walls are prefabricated; instead of supporting the building, they hang from the building's skeleton like curtains.

This spells revolution in the metal wall business, which once meant corrugated iron sheathing, period. Now metal building skins come in sections, some two stories high, complete with windows, insulation and built-in joints. Aluminum, stainless steel and porcelain enamel panels are all very much in the picture.

Even corrugated sheet for building walls has come of age. Now two sheets of corrugated metal with insulation between make a light, warm "sandwich" wall. It is finding applications in both industrial and office buildings.

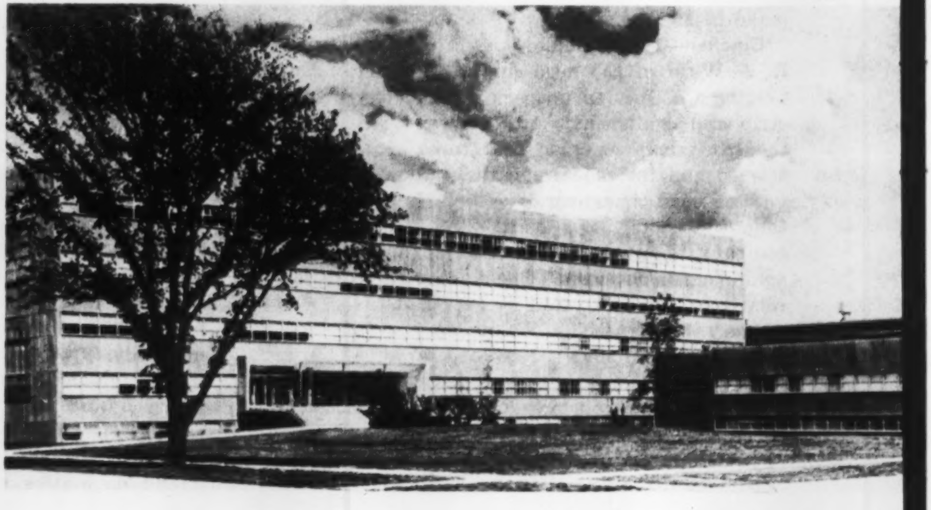
Among the many advantages claimed for such walls are their light weight, speed and ease of construction and freedom from attack by weather. They're beautiful too.

These walls of porcelain enamel are laminated to aluminum honeycomb

Seaporcel Metals Inc.

Sandwich walls of aluminum fit factory and office buildings equally well

Alcoa



British Steel Sets First-Half Record

Steel output for the first half, 1954, was 10.5 million net tons. The British Iron & Steel Institute now predicts a 20.4-million-ton year in 1954

BRITISH STEELMAKERS are confident they can set another record in steel output in 1954.

The British Iron & Steel Institute reports steel production for the first six months of 1954 was a record 10.5 million net tons and predicts an over-all 1954 output of 20.4 million net tons compared with 19.4 million net tons in 1953.

Along the Line—The remarkable strength of British steelmaking operations doesn't center in any particular product but spreads the width of the product fields. Plate mills, of course, are very active with heavy tonnages going to railway rolling stock builders for domestic consumption and for rolling stock for Commonwealth countries. Shipbuilders generally are booked with orders for at least a year ahead, some as much as two years, and are taking considerable tonnages of heavy plates.

Sheet mills are also very active working on orders for the British automotive trade. Considerable tonnages of sheets are also going to preferential overseas markets such as Australia. Rail mills will be busy for some time working on the big order for Persia (July 12, p. 77). The tube market is stiffening too. An indication of why: Stewarts & Lloyds, one of Britain's biggest steel tube manufacturers, recently got an order for 19,200 net tons of tubes for the Alaskan pipeline. Britain remains very much in the competition for world steel markets.

All Abroad—Britain is not only holding her own in steel product markets but in manufactured goods markets as well. Auto exports, for example, for the first half, 1954, total more units than the combined export totals of West Germany, France and Italy.

British Mill Goes on Sale

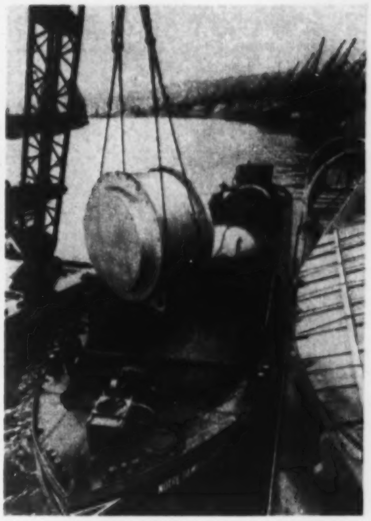
Considering Stewarts & Lloyds' evident competitive position in 1954 markets (see above) and the company's $30.8 million profits before taxes in 1953, it's surprising to find doubt whether the British Tory government will be able to denationalize S & L this month without trouble. The fear is that S & L stock will suffer the same fate as the United Steel Companies Ltd. and Lancaster Steel Corp. issues last year. Soon after they were offered, United Steel and Lancaster Steel issues dropped to a discount as private investors were scared off by Labor Party threats to renationalize steel again when the Laborites return to power.

Japan Pushes for Exports

Japan has set aside $30 million for imports of raw materials for what the Japanese Ministry of International Trade and Industry calls the "processing trade." The period of allocation is April through September, 1954.

Metalworking products included in the processing trade and items which may be imported for this program include: Electrolytic copper for bulbs, rolled copper products, metal dust; lead for storage batteries; magnesium for titanium sponge; timepiece parts for timepieces; tin plate for cans for canned food; tin plate for toys and enameled utensils; and tungsten ore for ferrotungsten.

The new edition of *Japan's Iron & Steel Industry,* 1953-54 contains the following statements by Yoshihiro Inayama, chairman of Japan Iron & Steel Exporters' Association and managing director of Yawata Iron & Steel Co. Ltd.: "The loss of sources of important raw materials such as iron ore and high coking coal because of World War II is generally considered a major catastrophe to the Japanese iron and steel industry . . . but my opinion is different. Though these raw materials are important, they are only one of many problems facing the industry. It can be solved by understanding the true nature of the problem and making full use of everything available to us." Mr. Inayama concludes that it is the ambition of the Japanese steel industry to export about 1.2 million tons of steel products and 300,000 tons of pig iron and semifinished products yearly.

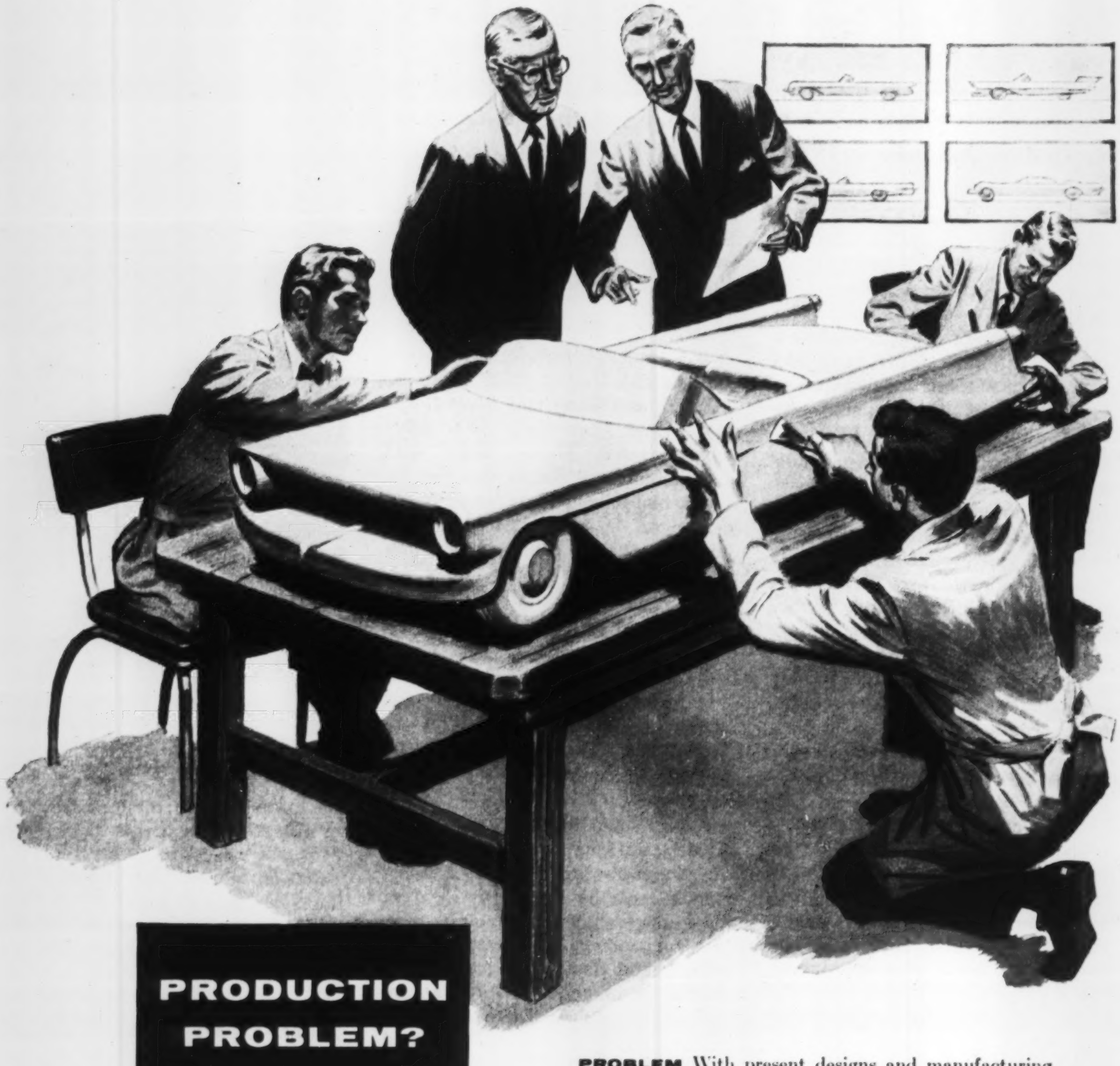


To Brighten Parisian Life

Teamwork between Westinghouse Electric Corp., its distributor in France and a French technical crew made possible installation of this 545,000-pound, 60,000-kva synchronous condenser in an overseas record time of 57 working days at the Harcourt substation of Electricite de France. It is the second such machine to be bought by Electricite de France to expand output

Import-Export Notes

Arthur D. Little Inc., Cambridge, Mass., has signed a contract with Foreign Operations Administration for continuation of FOA's industrialization project in Egypt. This contract extends until June, 1956. . . Dollar volume of European sales of business machines by Clary Multiplier Corp. in first half, 1954, was double that of the same 1953 period. . . The private maritime industry applauded the House-passed amendment to the Mutual Security Act requiring 50 per cent of all aid cargoes to go in American bottoms. . . Swindell-Dressler Corp. has a contract with Tata Iron & Steel Co. Ltd., India, for erection of new steelmaking facilities. No aid money is involved.



PRODUCTION PROBLEM?

if you use flat-rolled steel talk to a specialist

PROBLEM With present designs and manufacturing facilities, the auto industry needs wide coils of sheet steel with a minimum number of welds. These welds must be cut out before steel goes into the big presses—a costly, time-consuming process.

SOLUTION As a prime supplier to the automotive and other industries, Great Lakes Steel has developed facilities which now produce wide coils of steel in greater lengths . . . drastically reducing the number of expensive welds in each coil. Result: important fabrication savings for our customers.

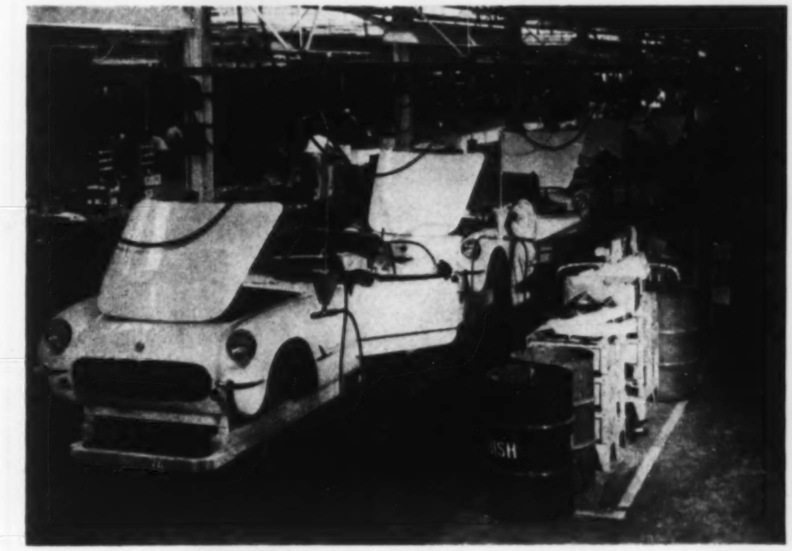
MORAL Whether you make autos, appliances, or farm machinery . . . if it's flat-rolled steel, you can't lose by talking to Great Lakes Steel—specialists in flat-rolled production and application for 25 years.

Great Lakes Steel
Detroit 29, Michigan

UNIT OF
NATIONAL STEEL CORPORATION

SALES OFFICES IN NEW YORK, CHICAGO, CLEVELAND, GRAND RAPIDS, LANSING, INDIANAPOLIS AND PHILADELPHIA

How Corvettes Roll off the Assembly Lines In St. Louis



ST. LOUIS

BUILDER of more Chevrolets than any other plant—that's the production record of the division's St. Louis facility.

The history of the division in St. Louis goes back to 1915 when Russell E. Gardner's Banner Buggy Co. purchased manufacturing rights and a franchise from the Chevrolet Motor Co. in Flint, Mich. When General Motors Corp. was formed in 1917, Mr. Gardner sold back the franchise for which he had paid $1 million and GM built its plant on 103 acres of new ground.

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732†	713,778
July		757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,817,846

Week Ended	1954	1953
June 12	139,312	167,095
June 19	141,878	170,357
June 26	140,695	173,702
July 3	133,141	140,724
July 10	107,262	167,560
July 17	120,000*	175,555

Source: Ward's Automotive Reports. †Preliminary. *Estimated by STEEL.

Buicks for a While—For a time in 1921 the Buick Division took over the present Fisher Body wing and a thousand Buick open cars were built here. During this period, Chevrolet Division was producing 14 passenger cars a day, quite a difference from the 850 passenger cars and 250 trucks which are turned out each day in St. Louis now. And as of the end of May, 4,540,250 Chevrolets had been built in the plant.

One of the first buildings erected was the Mill building where woodworking machinery was installed and the wood body parts of early cars milled. That's why it's more than a little nostalgic to discover that the same Mill building is today the home of one of the most modern little roadsters being turned out in the auto industry, the Chevrolet Corvette.

Shifty Corvette—About a year ago this column described Corvette manufacture in Flint's customer service garage. Admittedly a pilot operation, the plans had already been made to shift production to St. Louis, and on March 28, 1953, the assembly plant here was first notified. And as the buying public began to realize the facts of auto life, original plans to build only part of the production here were expanded. In October, 17 key men were dispatched to Flint to study Corvette production methods.

But as St. Louis plant manager W. L. Mosher Jr. explains it, "The contact didn't give us our answers. The Flint plant had a schedule of 300 Corvettes in the last six months of the year. The line was not tooled and was not expected to tool for volume. We were forced to design and build the jigs and fixtures we needed to reach a goal of 50 units a day."

Order of the Day—Jigs and fixtures are definitely the order of the day. The initial step in body assembly is the drilling of 200 holes in the underbody, only piece still being bag-molded. The other 61 are now matched metal die products. Colored circles around each drill bushing match colored drill bits telling the operator at a glance which size hole is drilled where. The drill jigs, incidentally, are themselves tool plastic which is light and easy to handle and can be made in a couple of hours.

Next the underbody goes to one of three water-curtain scuffing rooms where surfaces to be bonded are power sanded. The water curtain quickly carries away the dust particles created, as in paint spraying. Underbody reinforcements are then added together with certain metal brackets, and then the wiring harness is put on, a task almost impossible when the car is assembled.

Trucking the Underbody — At this point the underbody is on a truck with which it will remain until dropped on the chassis. The rear panel, meantime, has been matched with the seat bulkhead and is ready to be assembled on the underbody. A gate accurately locates the rear body panel subassembly. In the next water-curtain room the front panel is being drilled, scuffed, and the headlight holes are being routed. The headlight housing is then hand-fitted, and fiberglass roving is laid into the joint underneath the fender. The front end assembly includes the radiator shell, fender wells, etc., and when the entire assembly is complete, the fixture tips forward permitting two men to remove the unit. Formerly four men were required to lift it off.

In the matter of assembly, incidentally, engineers discovered that heat caused by the plastic setting would warp panels. Experimentation with proper amounts of accelerator and the use of asbestos filler which tends to prevent heat build-up have cured this problem.

Like Frosting a Cake—Also interesting in assembly is the use of inexpensive paper cones similar to cake decorator tubes to apply the plastic to the joint. And rivets which formerly were applied at the same time the plastic was put on are now added at the next station using a slower setting plastic.

The front end assembly is located using a jig which simulates a door to obtain proper relationship of the front, rear and underbody units. The door line is then scribed on the fender which is trimmed to fit. Typical of this craftsmanship is the headlight bezel which is fastened into position. Plastic is puttied in around it and ground to a perfectly flush fit. The Corvette being built today is being held to tolerances of 1/64 inch or better in many body parts, close cutting indeed for this method of assembly, with about a third of the body build-up line devoted to fitting doors, hood, top cover and rear deck lid.

Cured—The body in white is cured in an oven at about 140° F for an hour. Next comes steam cleaning followed by prime coat and another baking, water sand and back to the oven. Final interior and exterior painting with more baking and final polishing complete the job.

On the trim line, seats, upholstery, radiator, more wiring, radio, speedometer, instruments, side curtains and an erected top are placed in position, things which would normally not be done until the body is dropped on the chassis. As a final touch, a battery is hooked up and all electrical accessories are tested before the body is dropped, the theory being that when the car passes each phase of its construction it should be right to avoid repairs which can build up into prohibitive backlogs at the end of the line.

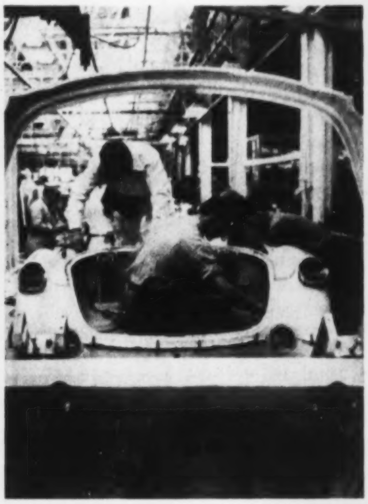
Parallelism — Paralleling the trim line as it approaches the body drop is the chassis assembly line. The engine, minus major accessories, is shipped to St. Louis from Flint. After such accessories as air cleaners and three carburetors are added, the engine is dynamometer-tested for half an hour with the Powerglide transmission simultaneously tested for governor and accelerator pressure to insure proper upshifting under load.

Another interesting feature of the chassis line, incidentally, is a specially built front wheel balancer which balances the wheels on the chassis while the line is in motion. Production men believe the Corvette is the only production car in the United States with wheels balanced when it comes off the line.

Much More—There were a number of other features of interest in the Corvette assembly as might well be imagined with the only plastic-bodied car reaching this volume. The Chevrolet assembly plant next door also has its share of unusual features, including a unique headlight alignment device which lifts the car and lines it up with the moving alignment machines automatically when the hood breaks an electric eye. And there's an automatic tire mounter which rolls on sets of five simultaneously soaped tires and tubes.

But typical of the St. Louis plant is the old Mill building producing Corvettes. More than 20 years ago it turned out roadsters. It's doing so again, with the roadster as modern as tomorrow.

Wet-sand polishing makes certain that Corvette plastic body is satin-smooth



Sixty-two sections riveted and bonded together form the plastic body shell

DIE CAST OF ZINC

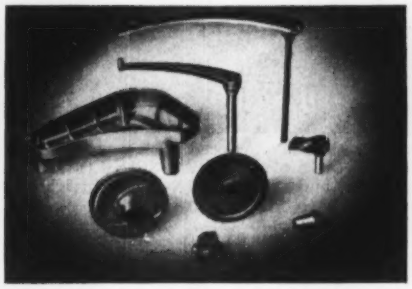
for WEBCOR

Here's Why....

The engineers of Webster-Chicago have one aim in their industrial lives—to provide high fidelity sound reproduction at a price which will assure wide market appeal for every instrument in the Webcor line. To achieve this objective in their three-speed HF phonographs, the eight odd-shaped ZINC Die Cast components shown below are employed in several models. Of these, the above tone arm-rest housing best illustrates the physical and economic advantages gained.

Metal Saving—Since the cost of any product is influenced by the amount of material consumed, it should be noted that the above housing (as shown from the underside) has been ingeniously cored—*in the casting operation*—to eliminate all unnecessary metal, and no metal need be removed and wasted in secondary operations. This metal saving is accomplished with no sacrifice of strength since cross ribs are judiciously located at points of stress.

Labor Saving—The housing and the other ZINC Die Castings have made possible a compact phonograph mechanism with an absolute minimum number of parts. When such complexity of shape can be achieved, one part can be made to serve in place of several. This, together with the accurately located cast bosses, makes for trouble-free assembly at the lowest possible cost. A further labor saving results from the smooth as-cast surfaces of the parts which easily receive and hold handsome, durable coatings.



Send for your copy

For further examples of successful product engineering with ZINC Die Castings ask us—or any die casting company—for a copy of "The End Uses of Zinc Die Castings."

The New Jersey Zinc Company
160 Front St., New York 38, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

How we opened the door to lower costs for Ford

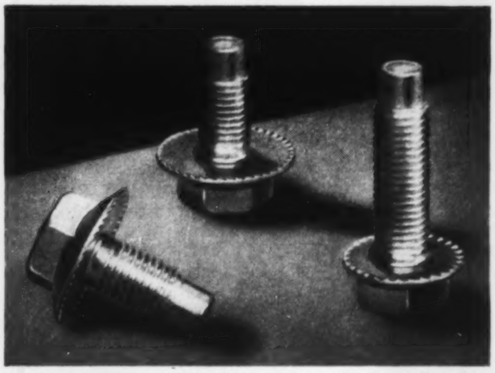
Two hinges on every Ford door. Six screws and 12 washers for each hinge.

Did this present an opportunity for cost reduction? An RB&W "fastener engineer" thought so. And after careful analysis and time studies Ford engineers agreed.

The solution: RB&W Hex SPIN-LOCK screws to fasten the hinge to the door, eliminating the need for washers. And special wide-flange Hex SPIN-LOCK screws for attaching the hinge to the frame, doing away with more washers. The wide flange is necessary to cover an elongated hole in which the hinge moves to permit accurate alignment.

Result — parts requirements are cut by two thirds, assembly is simplified, purchasing and inventory costs are lowered. And RB&W SPIN-LOCK screws hold those door hinges tight for good.

We will be glad to send an RB&W man around to check up on your fastening operations. Every problem is different, of course, but RB&W has a fastener for just about every job. If you need a "special", as Ford did, we'll design and make it for you. Write RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, New York.



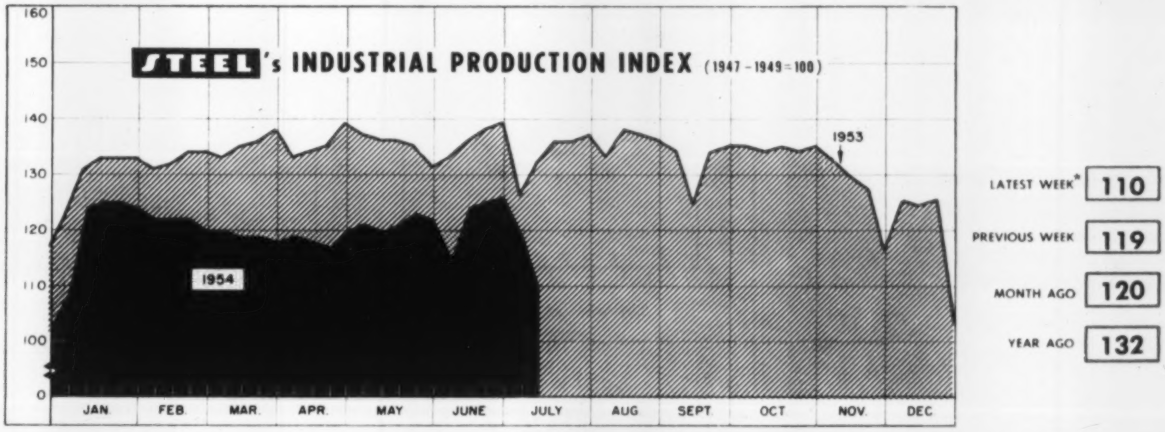
FASTER ASSEMBLY, reduced costs were the pay-off, using RB&W designed wide-flange SPIN-LOCK screws (left) for door hinge. Other SPIN-LOCKS (right) hold hinge on door. SPIN-LOCK screws *can't loosen* because ratchet-like teeth lock into surface and hold tight.

3.10

RB&W

109 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Plants at: PORT CHESTER, N.Y.; CORAOPOLIS, PA.; ROCK FALLS, ILL.; LOS ANGELES, CALIF. *Additional sales offices at:* ARDMORE (PHILA.), PA.; PITTSBURGH; DETROIT; CHICAGO; DALLAS; SAN FRANCISCO. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*



* Week ended July 10.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Employment Climbs Under Seasonal Influences

THE EMPLOYMENT down-trend has halted. Total employment in June was over 62 million, up about 1 million from May, according to the joint report on the labor situation issued by the Commerce and Labor departments.

The increase wasn't as large as usually occurs at this time of year, but at least it's a gain. Small further increases in employment can be expected for the rest of the summer, with a considerable upswing due in the fall.

Unemployment Levels Off—Most of the May-to-June rise was due to seasonal factors and was expected. Unexpected, though, was the report of no increase in unemployment for the period. The upswing in employment and a lower than usual number of college students entering the labor market are given as reasons for unemployment staying at about 3.3 million.

Employment in manufacturing industries remained about unchanged between May and June but on a sort of "rob Peter to pay Paul" basis: Nondurable goods industries added about 60,000 workers; durables dropped about 64,000. But even the 64,000 figure is encouraging; the April-to-May drop was about 108,000. Steadying employment was particularly noted in the primary metals and some metal fabricating industries.

Metalworking Losses—Still sliding downward at a good clip is employment in other metalworking industries — machinery, electrical machinery, transportation equipment, instruments and ordnance. Even so, employment in electrical machinery, transportation equipment and instrument industries remains high, second only to the peak levels of a year ago.

Construction accounted for a healthy share of the employment upswing, with about 100,000 workers added to payrolls. Contractors in June were employing about 2.7

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,559	1,430	2,314
Electric Power Distributed (million kwhr)	8,375[1]	8,825	8,096
Bitum. Coal Output (daily av.—1000 tons)	200	236	236
Petroleum Production (daily av.—1000 bbl)	6,425[1]	6,441	6,483
Construction Volume (ENR—millions)	$298.5	$323.9	$256.2
Automobile, Truck Output (Ward's—units)	107,262	133,141	167,560
TRADE			
Freight Car Loadings (unit—1000 cars)	615[1]	619	721
Business Failures (Dun & Bradstreet, no.)	198[1]	192	139
Currency in Circulation (millions)[3]	$30,154	$29,904	$30,279
Dept. Store Sales (changes from year ago)[3]	+18%	+3%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$16,605	$19,499	$16,959
Federal Gross Debt (billions)	$271.2	$270.5	$266.3
Bond Volume, NYSE (millions)	$16.2	$21.3	$12.3
Stocks Sales, NYSE (thousands of shares)	9,256	10,267	4,571
Loans and Investments (billions)[4]	$81.0	$80.7	$76.5
U. S. Gov't. Obligations Held (billions)[4]	$33.7	$33.4	$29.5
PRICES			
STEEL's Finished Steel Price Index[5]	192.47	189.75	189.18
STEEL's Nonferrous Metal Price Index[6]	215.8	215.7	206.6
All Commodities[7]	110.0	109.9	109.8
Commodities Other Than Farm & Foods[7]	114.4	114.3	114.4

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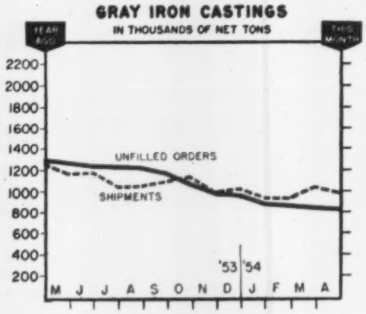
*Dates on request. [1] Preliminary. [2] Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3] Federal Reserve Board. [4] Member banks, Federal Reserve System. [5] 1935-1939=100. [6] 1936-1939=100. [7] Bureau of Labor Statistics Index, 1947-1949=100.

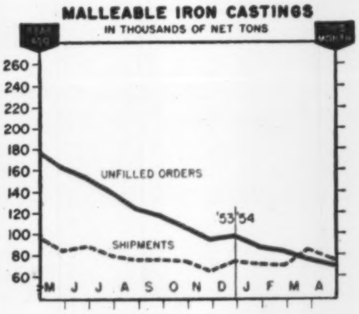


Thousands of Net Tons

	Shipments 1954	Shipments 1953	Unfilled Orders* 1954	Unfilled Orders* 1953
Jan.	932	1,162	872	1.333
Feb.	936	1,136	865	1,332
Mar.	1,047	1,264	842	1,376
Apr.	995	1,277	826	1.306
May	...	1,186	...	1,272
June	...	1.196	...	1,246
July	...	1,056	...	1,233
Aug.	...	1.069	...	1.223
Sept.	...	1,106	...	1,170
Oct.	...	1,142	...	1,076
Nov.	...	1,004	...	977
Dec.	...	1.032	...	955
Total ...	...	13.630		

*For sale, U. S. Bureau of the Census.

Charts Copyright 1954 STEEL.



Thousands of Net Tons

	Shipments 1954	Shipments 1953	Unfilled Orders* 1954	Unfilled Orders* 1953
Jan. ...	70.3	87.2	85.6	174.8
Feb. ...	69.1	86.5	81.6	175.1
Mar. ..	84.3	94.5	74.2	177.8
Apr. ...	74.5	95.9	69.1	174.5
May ...	...	82.1	...	160.4
June ...	...	86.5	...	151.0
July ...	...	77.1	...	137.3
Aug. ..	...	73.9	...	120.8
Sept. ..	...	74.3	...	114.5
Oct. ...	...	73.5	...	104.0
Nov. ...	...	63.4	...	93.2
Dec. ...	...	72.1	...	95.6
Total ..	...	966.9		

*For sale. U. S. Bureau of the Census.

million, equaling the 1952 record for the month.

Boom Goes On—And construction continues to boom, *Engineering News-Record* reports. More than $4 billion in heavy construction awards were made last quarter for the highest April-May-June period on record. The record-breaking rate of private construction has begun to slip, but this decline is being made up by more public contract awards.

Pointing to a coming upturn in business is the lengthening average factory workweek which now stands at 39.6 hours. The May-to-June jump in the primary metals industry was the largest for that industry in the postwar period.

Earnings Up—Weekly earnings are rising, too, putting more cash into the hands of consumers. And continuing high retail sales show the consumer is plenty willing to part with his dough.

Factory workers' average weekly earnings increased 94 cents to $71.68 between May and June. This is the largest over-the-month gain in weekly earnings since December, 1952. The jump will probably be even bigger from June to July because of steel, rubber and electrical workers' pay raises.

But even though indications show better business ahead, a general pickup won't be noticed until fall. Plant shutdowns for vacations and the usual summer slack-off in many manufacturing industries will combine to keep production indexes at about June levels for the rest of the summer.

Index Slumps Temporarily . . .

The Fourth of July week end and the coal miners' vacation dive-bombed STEEL's industrial production index for the week ended July 10 to a preliminary 110, the second-lowest point of the year.

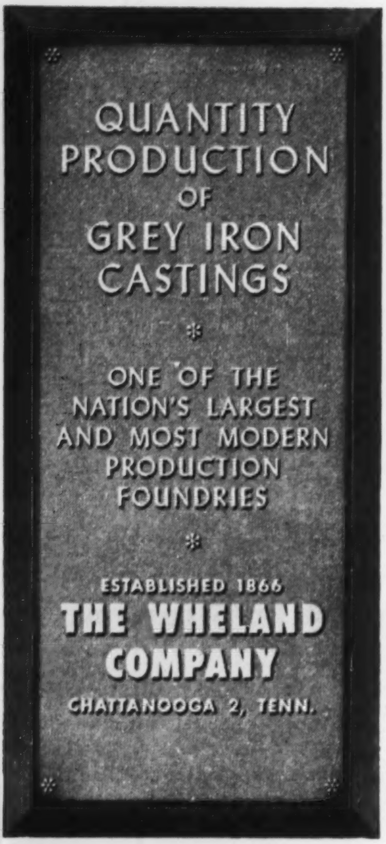
The holiday accounted for dips in steel production, electricity and auto output. The drop in coal production caused a steep slide in freight car loadings for revenue.

The index should bounce back to about preholiday levels.

Record Car Sales for June . . .

June new car sales of 560,000 are highest for any month since June of 1950, a 47-month period, says *Ward's Automotive Reports*. Because of the high sales and an 11-per-cent production cutback in June, new car inventories are at the lowest level in five months.

Ford Motor Co. dealers in June broke all sales records for the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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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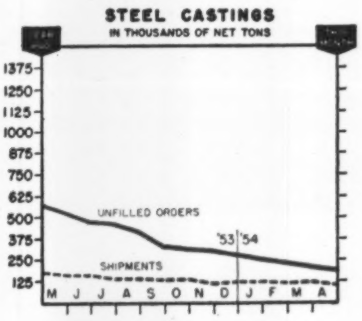
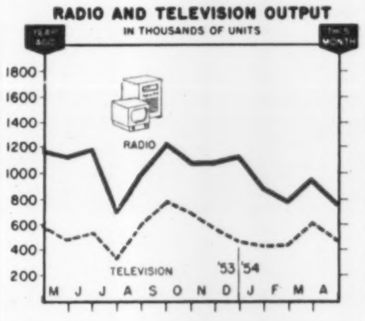


Thousands of Net Tons

	Shipments 1954	Shipments 1953	Unfilled Orders* 1954	Unfilled Orders* 1953
Jan. ...	122.8	167.2	251.8	706.5
Feb. ...	116.5	175.7	234.6	644.3
Mar. ..	122.3	182.2	214.3	634.6
Apr. ...	105.8	179.6	197.8	573.6
May ...	....	165.6	....	525.0
June ...	....	164.7	....	475.8
July ...	....	139.6	....	467.9
Aug. ...	....	141.3	....	418.9
Sept. ..	....	135.3	....	327.2
Oct. ...	....	140.7	....	313.7
Nov. ...	....	114.1	....	308.5
Dec. ...	....	123.3	....	278.4
Total ..	....	1,829.3		

*For sale. U. S. Bureau of the Census.



Thousands of Units

	Radio 1954	Radio 1953	Television 1954	Television 1953
Jan.	872	1,093	421	719
Feb.	769	1,192	427	731
Mar.	940	1,549	600	810
Apr.	745	1,159	458	568
May	...	1,109	...	482
June	...	1,164	...	524
July	...	674	...	316
Aug.	...	992	...	604
Sept.	...	1,217	...	770
Oct.	...	1,052	...	680
Nov.	...	1,066	...	560
Dec.	...	1,101	...	450
Total	...	13,368	...	7,214

Radio-Electronics-Television Mfrs. Assn.

month and for the first half of the year. Sales—highest in Ford's 51-year history—were, for the month, 222,816 Ford, Lincoln and Mercury cars and Ford trucks; for the first half, 1,040,099 units.

Thus, Ford again takes over the unofficial sales lead from Chevrolet. But the margin is so narrow that the winner of the sales race probably won't be known until the year is over.

Cadillac and Oldsmobile also hit new highs in June sales.

A Lesson To Be Learned? . . .

In spite of high sales, many dealers are calling for a further production cutback. Most of their showroom traffic (and most of their sales volume) is coming from bargain hunters. To make any profitable deals, the dealers say they have to go out looking.

Car production will continue to decline until new models come out but not as much as expected. *Ward's* says that in the low-priced field the current sales surge has prompted a 10,000-unit increase in output schedules for July.

Optimism in the West . . .

A quarterly survey of western states businessmen and manufacturers shows that more than 60 per cent expect third-quarter sales to equal or exceed those of the like period of last year. More than 70 per cent expect the third quarter to surpass the second quarter of this year.

Polled by Prudential Insurance Co.'s Research Department, more than half of the participants anticipate gains up to 10 per cent over a year ago, while 20 per cent expect the increase to approach 20 per cent.

Trends Fore and Aft . . .

A survey by Purchasing Agents Association of Chicago shows that 46 per cent of firms polled intend to shut down for vacations this summer compared to 38 per cent last year. . . Sparse inventories are losing sales for some companies, says the National Association of Credit Men. Better to have a slightly high but balanced inventory than meager and unbalanced stocks, counsels the association. . . Auto partsmakers are riding the financial rollercoaster right along with the rest of the automotive industry. Current earnings reports vary widely . . . Used car sales continue to hold up, bringing prophecies of no slump in new car market this fall.

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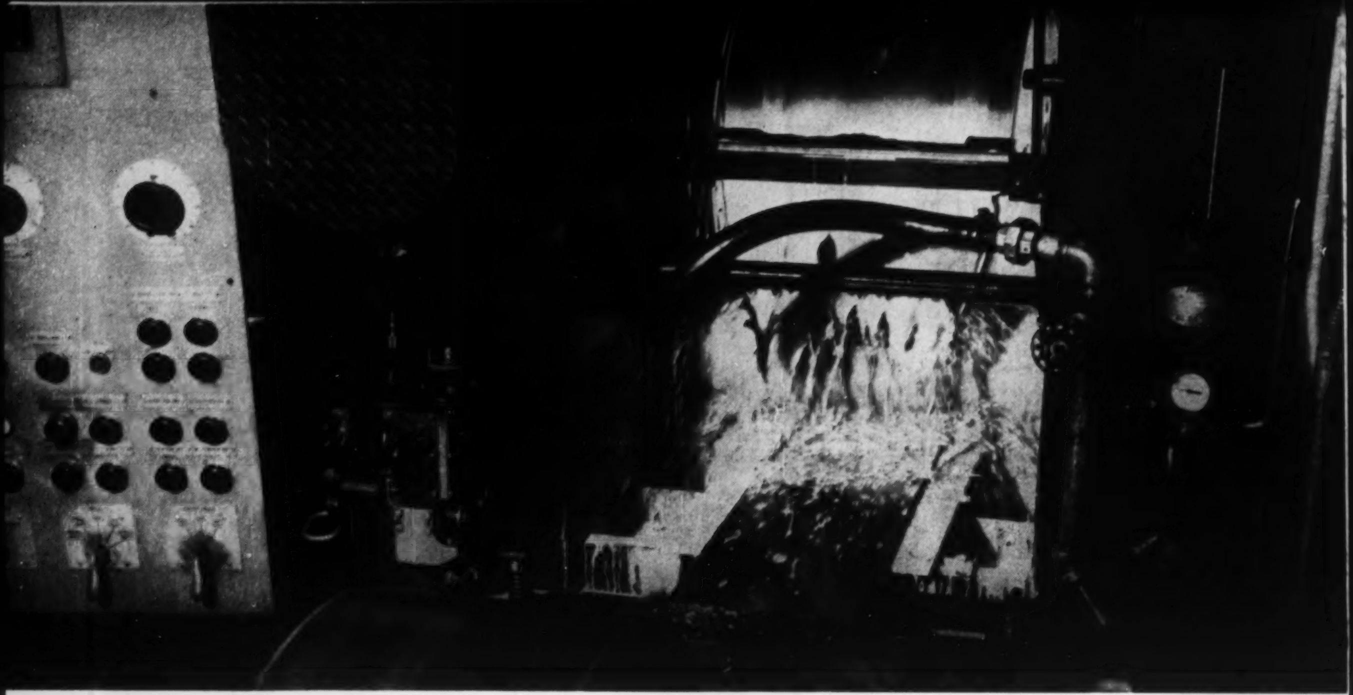


NEW SUNOCO EMULSIFYING ROLLING OIL EASIER TO USE, LASTS LONGER

It mixes readily in hard or cold water—forms whiter and more stable emulsions that can be used for a longer time. The lower viscosity of new Sunoco Emulsifying Rolling Oil makes it easier to pump from storage tanks. These improvements are the result of improved refining techniques made possible by several new multimillion-dollar refining units.

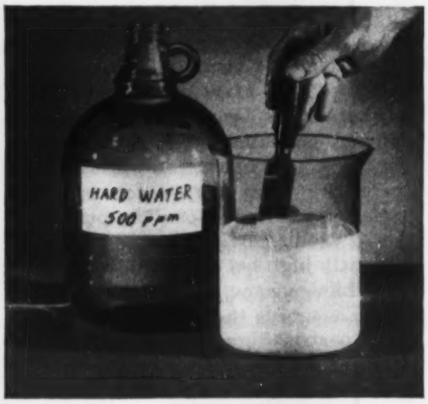
Users report cleaner rolls, reduced spalling, and absence of gumming. The result is lower power consumption and higher mill speeds—as much as 50% in many cases. In the annealing operations, Sunoco Emulsifying Rolling Oil burns off cleanly—usually making cleaning unnecessary. All of these advantages contribute to lower cost operation.

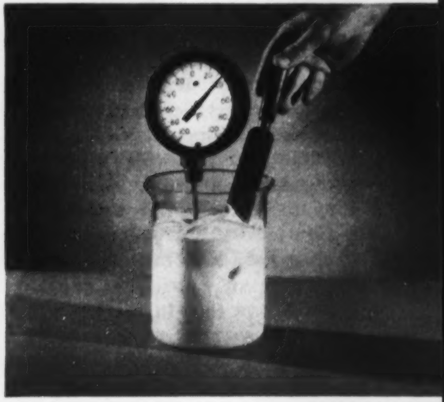
You can also use Sunoco Emulsifying Rolling Oil advantageously for rust proofing hot rolled sheets after pickling, and as a die lubricant in cold drawing steel bars.

The full story about this new oil is well worth your listening. Care to hear it? Just contact your Sun Oil Company representative. Or write Dept. S-7.

TESTS SHOW HOW READILY THIS NEW OIL FORMS STABLE EMULSIONS

HARD WATER—Tested in dozens of samples of water obtained from industrial plants having hard water problems. Never failed to form a stable emulsion.





COLD WATER—Forms a stable emulsion in the coldest water . . . even ice water.

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Made by the refiners of famous Blue Sunoco Gasoline and Dynalube Motor Oils

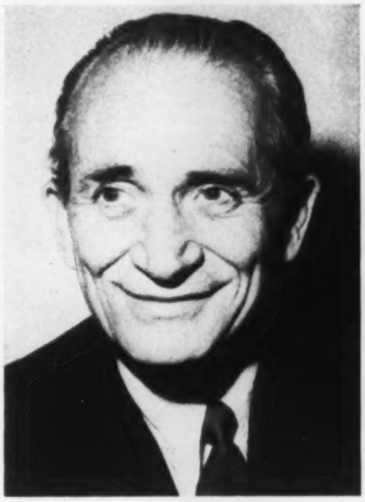
PETER J. JENSEN
. . . named manufacturing mgr. at Carboloy

Peter J. Jensen was named manager of manufacturing at General Electric Co.'s **Carboloy Department,** Detroit. Except for 22 months in the Army Ordnance Corps, Mr. Jensen has been manager of Carboloy's Michigan sales district since 1948. He is succeeded by **John A. Muldoon,** who has been assistant to the vice president-manufacturing.

I. Nevin Palley, former chief of missile design for Chance Vought Aircraft, joined **Temco Aircraft Corp.,** Dallas, in the newly created post of vice president-engineering, in charge of all engineering and electronic activities. Reporting to him will be **H. G. Erickson** who continues as chief engineer, and **G. B. Spaulding** who continues as superintendent of electronics.

Frank L. McCann was elected vice president-sales, **Edgcomb Steel of New England Inc.,** Milford, Conn.

Walter P. Hooper was made administrative vice president of **Panellit Inc.,** Skokie, Ill., and its two divisions, Panalarm and Panascan. Mr. Hooper, whose administrative experience includes the presidency of Wales-Strippit Corp., will have headquarters in the new Panellit building in Skokie where the entire operation of the company and its two divisions will be consolidated next month.



E. H. STAU
. . . joins Olympic Screw & Rivet

E. H. Stau joined **Olympic Screw & Rivet Corp.,** Downey, Calif., as vice president and director of sales. He formerly was sales manager for aircraft at Townsend Co.'s Cherry Rivet Division.

H. E. Chilcoat, general sales manger, **Townsend Co.,** New Brighton, Pa., was elected vice president-general sales manager. In further expansion of its general sales division, Townsend established a technical sales department which is headed by **H. C. Weidner Jr.,** newly elected vice president-technical sales. He formerly served as division sales manager at Cleveland. Assisting Mr. Weidner will be **Frank Boyd,** formerly in charge of the firm's process engineering department; **William Arnoldy,** field application engineer transferred from Detroit; **F. S. Scott,** field application engineer transferred from Cleveland; and **E. J. Moore** from hearquarters staff.

E. T. Walton, former chief metallurgist at **Crucible Steel Co. of America's** Midland, Pa., Works, was appointed to the central metallurgical offices in Pittsburgh as metallurgical engineer. **Charles W. Schott** becomes plant metallurgist at Midland and **J. D. Dickerson** assumes Mr. Walton's former duties and assumes complete responsibility for all metallurgical and inspection at the Midland plant.

WILLIAM IRRGANG
. . . Lincoln Electric president-gen. mgr.

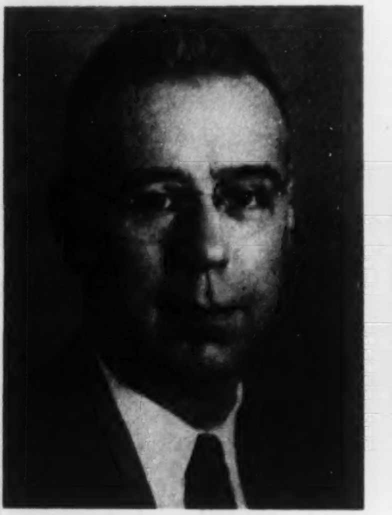
Lincoln Electric Co., Cleveland, elected **William Irrgang** president and general manager. **James F. Lincoln,** elected chairman of the board, remains active in the direction of company policies. **John C. Lincoln,** founder of the company, was elected honorary chairman of the board and treasurer. Other officers elected include **John S. Roscoe,** executive vice president; **A. F. Davis,** vice president and secretary; and **George Landis,** vice president.

U. S. Steel Corp., Pittsburgh, in expansion of its research activities, elected three assistant vice presidents. They, and the work they will head, are: **James B. Austin,** fundamental research; **Max W. Lightner,** applied research and development; and **Robert W. Holman,** operations research.

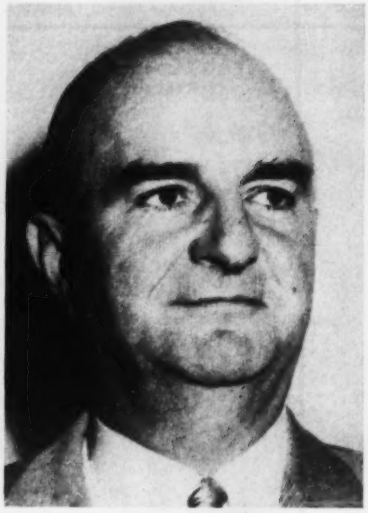
George J. Fisher was made director of the metallurgical department of **Sam Tour & Co. Inc.,** New York. He was with Western Electric Co.

Buffalo Bolt Co., division of Buffalo-Eclipse Corp., appointed **Clarence E. Zettel** general sales manager with headquarters in North Tonawanda, N. Y. **Clifford A. Mesler** succeeds Mr. Zettel as district manager at Chicago.

Arthur Tauscher was made plant engineer in charge of maintenance



DR. CARL B. POST
. . . metallurgical head at Carpenter Steel



HARRY R. MEYER
. . . Lukens divisions sales mgr.

KENNETH V. LUTZ
. . . All-State Welding gen. sales mgr.

and construction of **Cooper Alloy Foundry Co.**, Hillside, N. J.

Dr. Carl B. Post, chief metallurgist, was appointed head of the metallurgical and research departments of **Carpenter Steel Co.**, Reading, Pa. **George V. Luerssen**, vice president-metallurgy, retires after 47 years of service with the company.

Euclid Electric & Mfg. Co., Cleveland, elected **R. G. Schrock** president to succeed **Charles S. Ettenger**, now chairman and secretary. Mr. Schrock has been executive vice president. Mr. Ettenger, one of the founders of the firm, served as president since 1941.

Harry R. Meyer was named manager of sales for the By-Products and Lukenweld Division of **Lukens Steel Co.**, Coatesville, Pa. He completes his 35th year as a member of the Lukens sales organization.

Joseph N. Dalsen retired as president of **American Fabricated Steel Co.**, Philadelphia.

Albert P. Schweizer succeeds **J. Harold Hunt**, retired, as vice president-automotive engineering of **Motor Wheel Corp.**, Lansing, Mich. Mr. Schweizer, former executive engineer, is succeeded by **Raymond J. Wilcox** who has directed tool, die and machine design and the estimating and processing division.

Kenneth V. Lutz was appointed general sales manager of **All-State Welding Alloys Co. Inc.**, White Plains, N. Y. He has been general field manager.

T. R. Gill was elected president and a director of both **General Supply Co.** and **G. S. Equipment Co.**, Cleveland. He is vice president of Singleton Co. and general manager for all three firms.

G. R. Luallen was made national purchasing director for **Toledo Desk & Fixture Corp.**, Toledo, O., manufacturer of Beauty Queen steel kitchens and bathroom vanities. In addition to responsi-

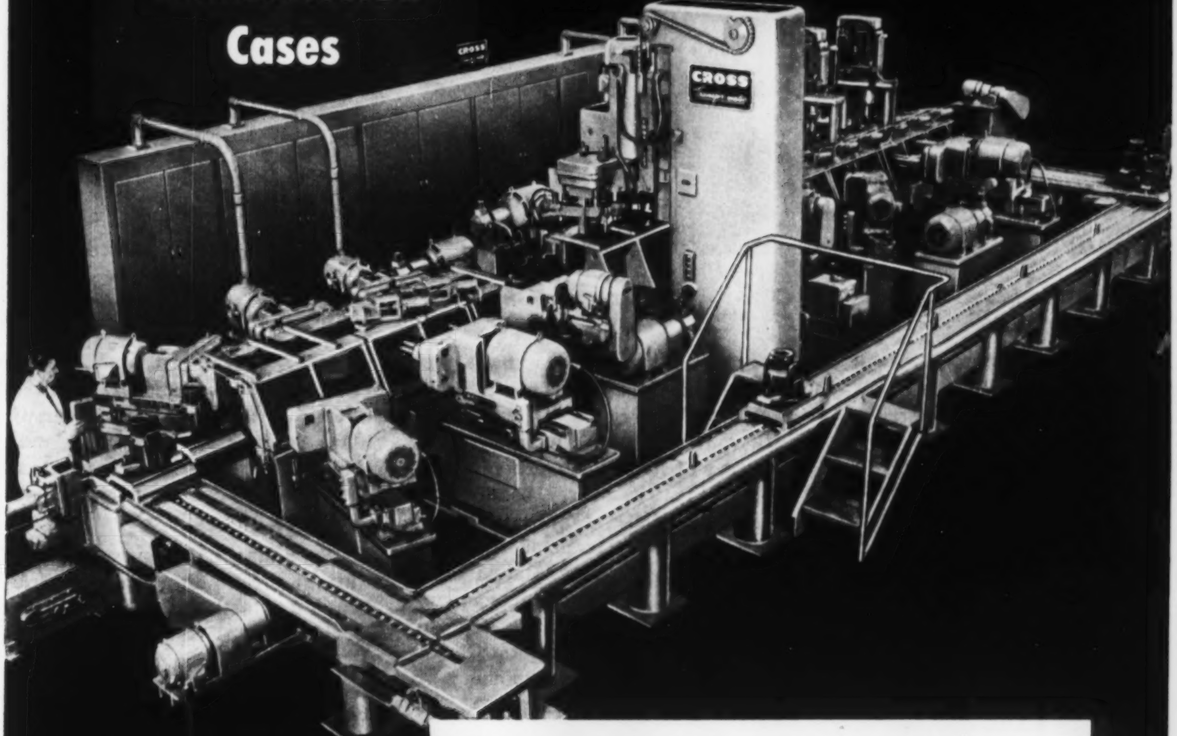
R. G. SCHROCK
. . . president, Euclid Electric & Mfg.

ALBERT P. SCHWEIZER
. . . Motor Wheel Corp. v. p.-engineering

G. R. LUALLEN
. . . Toledo Desk & Fixture purchasing dir.

Drills, Bores, Reams and Taps Transmission Cases

Another Transfer-matic by Cross



- ★ 107 operations: 84 drilling, chamfering and reaming, 8 spotfacing and counterboring, 4 boring, 6 tapping, 5 inspection.
- ★ 95 parts per hour at 100% efficiency.
- ★ 21 stations: 1 for loading, 1 for unloading, 15 for machining, 4 idle.
- ★ Machine stops automatically if critical tools are broken or improperly set for depth.
- ★ Pallet type work holding fixtures with automatic transfer from station to station and integral conveyor for automatic moving from unloading to loading station.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Other features: Hardened and ground ways, built-in chip conveyors, hydraulic feed and rapid traverse, individual lead screw feed for tapping, automatic lubrication and J.I.C. construction.

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THE CROSS CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

J. W. MARRINAN
. . . Superior Steel v. p.-operations

KENNETH SLAWSON
. . . Ford Instrument v. p.

RUSSELL T. DRENNAN
. . . Kaiser Chemicals gen. sales mgr.

bilities at the factory, he will direct purchasing for all of the firm's distribution centers.

J. W. Marrinan was elected vice president in charge of operations of **Superior Steel Corp.,** Pittsburgh. Operations previously were under **E. J. Reardon,** executive vice president, who now devotes more time to new product development and handling of specialized government contracts. Mr. Marrinan recently joined Superior as assistant manager of operations.

Austin J. Paddock was elected vice president in charge of contracting for U. S. Steel Corp.'s **American Bridge Division,** Pittsburgh. **R. Bruce Hunter** was elected vice president in charge of manufacturing, succeeding Mr. Paddock.

William C. Buell Jr. retired as a member of the consulting staff of **Arthur G. McKee & Co.,** Cleveland. His services are available for consultation or reports on matters concerned with steel ingot production.

Kenneth Slawson was made vice president, **Ford Instrument Co.,** division of Sperry Corp., Long Island City, N. Y. He continues to assist Ford's president and general manager. In 1946 Sperry acquired E. G. Staude Mfg. Co. Division and Mr. Slawson was made manager. He continued with Staude until late last year when that company was sold to E. G. Staude Mfg. Co. Inc., a subsidiary of Bryant Chucking Grinder Co. He rejoined Ford Instrument last January.

James M. Kelly was made plant industrial engineer at the East Hartford, Conn., plant of Republic Steel Corp.'s **Union Drawn Steel Division.** He succeeds **Ralph V. Darragh,** made industrial engineer for the five-plant Union Drawn Division.

E. B. Brant was made product manager, Acco aluminized wire and wire products, **Page Steel & Wire Division,** American Chain & Cable Co., Monessen, Pa. Previously he was Pittsburgh district sales manager of the division.

Russell T. Drennan was named general sales manager, **Kaiser Chemicals Division,** Kaiser Aluminum & Chemical Corp., Oakland, Calif. **John Minshall,** a product specialist at Akron, remains there as eastern regional sales manager.

R. F. Edgar heads new regional Chicago offices of **Warner Electric Brake & Clutch Co.,** which will be located at 6429 W. North Ave. The newly created region includes offices in Chicago, Milwaukee, St. Paul, Denver, Kansas City, St. Louis and Beloit, Wis.

Crucible Steel Co. of America, Pittsburgh, established a new tool steel research division within its sales department. The new division, located at Crucible's tool steel manufacturing center, Sanderson-Halcomb Works, Syracuse, N. Y., is headed by **M. E. Cummings,** who resigned duties as assistant vice president of operations.

Edward K. Waldschmidt was made manager of sales of the new Hi Strength Steel Division, **Republic Steel Corp.,** Cleveland.

OBITUARIES . . .

Q. G. Noblitt, 71, co-founder and chairman of **Arvin Industries Inc.,** Columbus, Ind., died July 3.

William Hildebrand, 62, material control supervisor for **J. H. Williams & Co.,** Buffalo, died July 5.

Robert W. Swartzbaugh, 46, personnel director and head of industrial relations, **Electric Auto-Lite Co.'s** Fostoria, O., plant, died July 4.

John M. Spencer, 71, retired president, **Hobart Mfg. Co.,** Troy, O., died June 30.

Donald B. McLouth, 52, president and founder of **McLouth Steel Corp.,** Detroit, died July 10 of a heart attack.

H. Frank Coulter, plant manager, **Fort Pitt Bridge Works,** Pittsburgh, died June 29.

A. J. Schwartz, secretary-treasurer, **Atlantic Brass & Copper Co. Inc.,** Brooklyn, N. Y., died July 1.

Arthur H. Ingle, 77, who retired in 1952 as president of **Consolidated Machine Tool Corp.,** Rochester, N. Y., died July 1.

Retooling prohibitive because capital's limited?

use Kearney & Trecker's

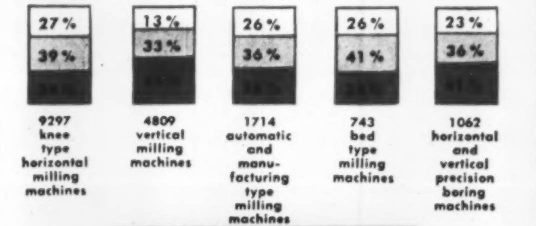
TOOL-LEASE PROGRAM

You can meet changing competitive conditions — without a big cash outlay — with new milling and precision boring machines leased from KEARNEY & TRECKER

LET'S LOOK AT THE OBSOLESCENCE PICTURE IN THE METALWORKING MACHINERY INDUSTRY

Here's the picture in a typical basic industry — MFG. OF METALWORKING MACHINERY — (see chart below). Of the 18462 standard knee type horizontal, vertical, bed and manufacturing type milling machines and precision boring machines in use today — *which could be replaced by Tool-Lease* equipment — 32% are 10-20 years old, 22% are more than 20 years old!

A similar detailed breakdown of 15 other basic industries is available in the booklet — "Critical Picture of Creeping Obsolescence." (Adapted from 1953 McGraw-Hill survey)



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MACHINE TOOLS
EQUIPMENT

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BY MODERNIZING WITH TOOL-LEASE YOU CAN ELIMINATE UNNECESSARY OVERHEAD

Kearney & Trecker's Tool-Lease Program offers operating management a quick way to stop the trend of rising costs, increasing competition and shrinking profit margins. With Tool-Lease, you can enjoy optimum flexibility to meet changing production requirements while avoiding the risk of high obsolescence. What's more, Tool-Lease enables you to keep your plant modern without tying up working capital.

TOOL-LEASE OFFERS A CHOICE OF PLANS TO MEET INDIVIDUAL NEEDS

Under Tool-Lease, you can rent any of over 250 standard Kearney & Trecker knee or bed type milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

GET ALL THE FACTS NOW

For complete information on Tool-Lease . . . help in analyzing your milling and/or precision boring needs — see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

KEARNEY & TRECKER CORPORATION
6784 W. National Ave. • Milwaukee 14, Wis.
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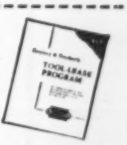

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Title..

Company..

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City........................ Zone........ State........

STANDARDS and SPECIALS by the *Millions*

THE FERRY CAP & SET SCREW CO.

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"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 90,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength in accordance with SAE Grade 5. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength in accordance with SAE Grade 2. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

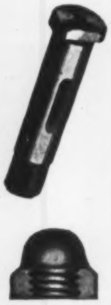
All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

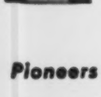
CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.



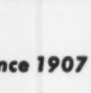
SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.



FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.



Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

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SPECIFICATIONS

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Builds Research Center

Metal Division of Continental Can will occupy facilities in Chicago late next year

CONTINENTAL CAN CO., New York, is building a research and development center in Chicago for its Metal Division. The building is expected to be ready for occupancy in late 1955.

"The center will provide expanded facilities for the Metal Division, in keeping with the company's program of decentralizing its research and development work by product divisions, and will be designed to provide room for future expansion as the division's research department grows," says Thomas C. Fogarty, executive vice president in charge of the Metals Division.

Facilities — The structure will cover more than 200,000 sq ft of floor space. Administrative offices, laboratories, container and research pilot plant areas for cannery and canmaking equipment, a library and dining room will occupy the first floor. Additional laboratories, the machine and product development departments and the engineering design and drafting department will be located on the second floor. The third floor will be used entirely for laboratories, while the basement will house machine shops and storage rooms.

"Engineering as well as research personnel will be located in the new structure, thus permitting the integrated processing of an idea through the phases of research, engineering design, production and final evaluation," Mr. Fogarty says.

Granite City Holds Open House

Granite City Steel Co., Granite City, Ill., held its first customers' plant tour of its enlarged mill. The company began its $89-million expansion program in 1947 and completed it only a few months ago. James L. Hamilton Jr., vice president in charge of sales, points out that the firm has increased its annual ingot capacity from 620,000 tons in 1947 to 1,290,000 tons in 1954, a gain of 108 per cent. Major items in the $89-million project include $25 million for a blooming mill and auxiliary equipment, $16 million for a roughing mill, $14 million for three 285-ton open-hearth furnaces, $8 million for a cold strip mill, $11.5 million for two blast furnaces and auxiliary equipment, $4.5 million for new coke ovens. (See STEEL, May 18, 1953, page 52)

Pittsburgh Firm Opens Branch

Protective Coatings Division, Pittsburgh Coke & Chemical Co., Pittsburgh, opened a divisional sales office in Dallas. O. E. McCullough Jr. is in charge of cold coating sales in that office.

Castings Firm Leases Plant

Industrial Metal Casting Corp., Cleveland, a wholly owned subsidiary of Mercast Corp., New York, has leased its plantwide facilities to Alloy Precision Castings Co., Cleveland. The Mercast process involves the use of frozen mercury in the formation of expendable patterns during the production of investment castings. The leasing of Industrial Metal's facilities will enable Alloy Precision to produce larger pieces than now possible.

United Press

Builds "Barrel" Furnace

Workmen put finishing touches on an eight-section gradient "barrel" furnace at Selas Corp. of America's Philadelphia plant. It will be shipped to a new mill in Phoenixville, Pa. The mill will produce large-size, heavy-wall, seamless steel pipe, now in critical need in atomic development field

Conway Honored in Holland

A bronze plaque of Carle C. Conway, chairman of the executive committee of Continental Can Co., New York, was unveiled recently in Deventer, Holland, at the new research laboratory of Thomassen & Drijver, Holland's largest manufacturer of metal containers. The plaque was unveiled by Mrs. Conway during the dedication ceremony for the new laboratory which has been named in honor of her husband, former president and board chairman of Continental.

Rheem Mfg. Expands

Rheem Mfg. Co., Downey, Calif., opened a manufacturing division at 11711 S. Woodruff Ave., that city, for increased production of jet engine components.

Long Building Radiator Plant

Long Mfg. Co. Ltd., a subsidiary of Borg-Warner Corp., Chicago, is building a $1-million factory on Kerr street, Toronto, Ont., for the manufacture of automobile radiators. C. F. Stevenson is vice president and general manager of the Canadian company.

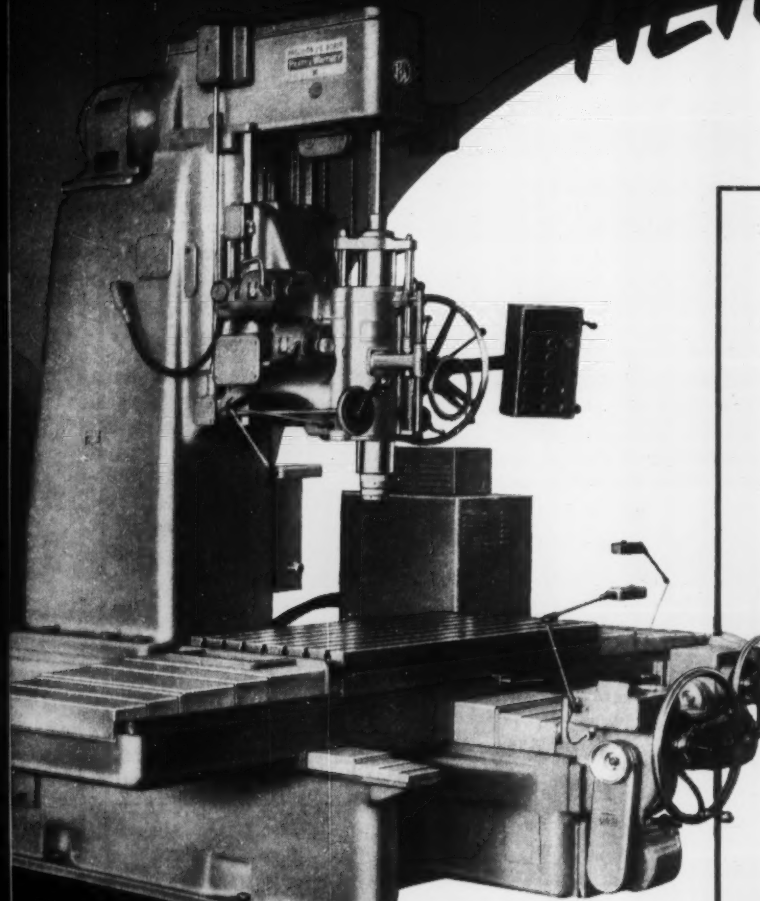
National Can To Expand

National Can Corp. let contracts for a major expansion program at its plant at the foot of Wolfe street, Baltimore. Initial work calls for an expenditure of $2,255,000 and will include construction of 200,000 sq ft of additional manufacturing space. Work also will go ahead on a new pier. The company's executive offices are in Chicago.

Roebling Producing New Item

John A. Roebling's Sons Corp., Trenton, N. J., is now in full commercial production of tellurium alloy lead sheath cable. The firm is manufacturing this type of sheath under license from General Electric Co., Schenectady, N. Y., which developed it. Several lengths of tellurium alloy lead sheathed cable are being tested by utility companies and nearly 150,000 ft of cable were sold recently for

(*Please turn to page* 82)



THE

PRATT & WHITNEY NUMBER 3

Table Working Surface: 28" x 56"

This latest addition to the Pratt & Whitney Electrolimit Series augments this famous Jig Borer Line. With ample capacity for all but the largest jobs, the Number 3E is a powerful machine that handles a wide range of work sizes with speed, ease and efficiency.

BRINGING YOU THESE IMPORTANT ADVANTAGES OF ALL P&W ELECTROLIMIT JIG BORERS . . .

"TENTHS" ACCURACY EASILY, POSITIVELY . . . ***with the exclusive P&W Electrolimit Measuring System***

This method of locating the table is extremely fast, accurate and simple to use. Basic 1 inch spacings are obtained ***electromagnetically*** from solid master bars; there are no contacting surfaces; possibility of lost accuracy through wear is eliminated. Fractional inches are obtained by means of an easy-to-set, precision micrometer screw reading direct to .0001 inches. . . . .

PRECISION PRELOADED BALL ROLL QUILL . . . ***Retains Initial High Precision Indefinitely***

The hardened, ground and lapped spindle "roll-feeds" in a preloaded ball roll mounting. "Tenths" accuracy is maintained indefinitely. Unlike plain bearing type quills, no maintenance or adjustment is required.

CENTRALIZED PUSH BUTTON OPERATION . . . for maximum convenience and ease.

ADVANCED DESIGN MOTOR CONTROLS . . . centralized in cabinet for easy access.

AUTOMATIC PRESSURE LUBRICATION . . . for [illegible] and bed ways insures proper operation and long accurate life.

MORE CONVENIENT HANDLING OF LARGE, IRREGULAR WORK PIECES . . . ***with P&W Open Side Construction***

Provides far greater speed and ease in handling than is possible with two-column construction.

TELESCOPING GUARDS... protect carriage and bed ways.

OTHER PRATT & WHITNEY JIG BORERS

ELECTROLIMIT TYPES .... Number 1E, 2E and 4E, with table sizes from 12" x 24" to 36" x 72".

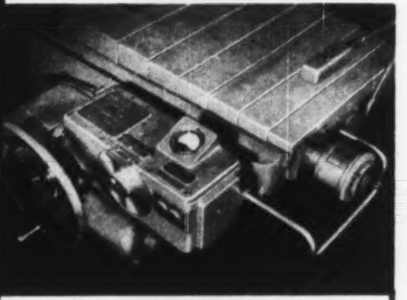
END MEASURE TYPES .... a complete line with table sizes from 12" x 24" to 24" x 54"

PRATT & WHITNEY
announces the availability of a
28 minute, 16mm, sound,
COLOR FILM on JIG BORERS
"ACCENT ON ACCURACY"
for group showings. Write on
Company or Official Society
letterhead for reservation.

E *Electrolimit* JIG BORER

COMBINING EXTREME ACCURACY WITH ADDED PRODUCTIVE EFFICIENCY

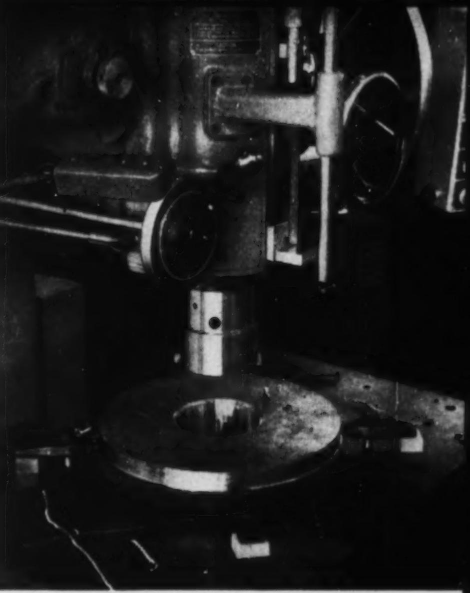
PLUS THESE OUTSTANDING NEW FEATURES FOR HEAVIER METAL REMOVAL...

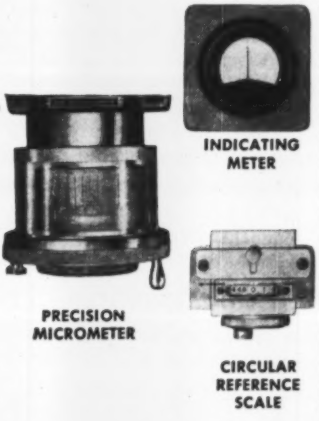


ELECTROLIMIT MEASURING SYSTEM

THE P & W DOUBLE BIT BORING BAR

Specifically designed for fast, accurate production boring, the two carbide bits provide a "balanced cut" that enables the Number 3E to make use of its full horsepower for rapid metal removal when machining tough alloys. Up to 1/2" of metal can be removed per revolution, with each bit taking off 1/8". For maximum rigidity, the DOUBLE BIT BORING BAR *screws directly* onto the spindle nose.





FOR *Added Versatility*

THE P & W MILLING ADAPTER

The ability of the P&W Ball Roll Quill to withstand lateral pressures without wear or deflection has made it practical to provide the 3E Jig Borer with electronically controlled milling feeds and to make available the new MILLING ADAPTER. Now you can make light, precision milling cuts with ease . . . and benefit from this extra utility of an already versatile machine. Like the Double Bit Boring Bar, the Milling Adapter screws directly onto the spindle nose for maximum rigidity.

SEND NOW FOR COMPLETE INFORMATION

. . . see how the advantages offered by the Number 3E [illegible] free copy of Circular No. 370.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY
WEST HARTFORD 1, CONNECTICUT, U. S. A.
SINCE 1860

MODERNIZE with PRATT & WHITNEY REPLACE FOR PROFIT

First Choice for Accuracy

Branch Offices . . . BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS (The Stamco Co.) • DETROIT • HOUSTON (The Stamco Co.) LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • SAN FRANCISCO • ST. LOUIS • EXPORT DEPT. WEST HARTFORD

MACHINE TOOLS • CUTTING TOOLS • GAGES

Experimental Electric Generating System Developed
International Harvester Co., Chicago, has developed an experimental electric generating system designed to make the tractor a mobile source of electric power, as well as mechanical power, for a wide variety of uses on the farm. Shown above, it supplies power in the wood lot for the operation of a chain saw

(*Continued from page* 79)

actual operational purposes. Tests show that cable sheaths made of this alloy possess stabilized bending and creep resistant properties of superior quality. Extrusion in the Roebling factory has shown that ease of control of the new alloy is one of its desirable characteristics. It is extruded on a standard lead press and allows a wide range of heat treatments.

National Supply Opens Store

National Supply Co., Pittsburgh, opened an oil well equipment and supply store at Worland, Wyo. Kenneth E. Curtis is manager of the store.

Eclipse To Build in Canada

Eclipse Fuel Engineering Co., Rockford, Ill., announced plans for a plant in Toronto, Ont., for its subsidiary, Eclipse Fuel Engineering Co. of Canada Ltd. To be completed in August, the structure will have facilities for limited manufacture, assembly and stock shipment of gas and oil-fired heating appliances. The Canadian firm handles the complete line of products produced by the Rockford company, including industrial furnaces, burners, valves, mixers, blowers and pressed steel pots.

Toolmaker Changes Name

Precision Tool Service, Alhambra, Calif., changed its name to Don Richetts Co. The firm manufactures tools, accessories and parts.

Trimble & Fink To Move

Trimble & Fink Mfg. Co., Baltimore, maker of screw machine products, dies, jigs, and fixture tools, plans to move this summer into 13,000 sq ft of space at Guilford avenue and Chase street.

Heli-Coil Offers New Service

Heli-Coil Corp., Danbury, Conn., organized a "thread engineering advisory service" to make available to industry the specialized know-how of a staff of fastening engineers. Problems which will be studied include tapped thread strengths in brittle metals, light metals, plastics or wood; space limitations caused by tight design specifications; frictional wear on threads subject to frequent disassembly; vibration wear on threads subject to extreme oscillation; corrosion resistance of threads subject to high humidity or reactive atmosphere; and thread deterioration caused by high temperatures.

Power Shovel Firms Unite

Marion Power Shovel Co., Marion, O., manufacturer of power shovels and other excavating machinery, purchased controlling interest in Osgood Co. and the latter's wholly owned subsidiaries, General Excavator Co. and Commercial Steel Casting Co., all of Marion. Osgood and General Excavator make lines of power shovels and cranes in sizes up to 2½ cu yd that supplement the line of machines built by Marion Power Shovel.

Dresser Sells Kobe Inc.

Dresser Industries Inc., Dallas, manufacturer of oil, gas and chemical equipment, sold one of its operating units, Kobe Inc., Division of Dresser Equipment Co., Huntington Park, Calif. Kobe Inc. makes hydraulic oil well pumping equipment. Principals in the purchase are a group of investors, headed by C. J. Coberly, company founder.

National Lead Gets AEC Work

National Lead Co., New York, is operating the U. S. Atomic Energy Commission's Raw Materials Development Laboratory at Winchester, Mass. Prior to July 1, the facility had been operated by American Cyanamid Co., New York. The laboratory is concerned principally with development of processes for treatment of uranium-bearing ores in the production of uranium concentrates.

Packard Electric Expanding

General Motor Corp.'s Packard Electric Division, Warren, O., will begin construction soon on its plant to house a rod mill for handling copper rod for the division's plants. Estimated cost is between $1.5 million and $2 million.

Plans Canadian Exploration

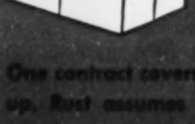
New Jersey Zinc Co., New York, entered into agreements with Big Game Mines Ltd., Gui-Por Uranium Mines & Metals Ltd., Moon Lake Uranium Mines Ltd. and Calder-Bousquet Gold Mines Ltd., all of Toronto, Ont., under which it may acquire majority control of those

TRIPLE-FIRED
Continuous Reheating
FURNACES

. . . built for U. S. Steel Corporation at Fairless Hills, Pa.

Four Rust Slab Reheating Furnaces, with a total capacity of 540 tons per hour, are now in operation in the new Fairless Works of United States Steel Corporation. Similar Rust installations have served efficiently through the years to reheat slabs, blooms and billets in U.S. Steel's various other plants. Rust also designs and builds the different types of furnaces to meet all of your needs for melting, reheating, or heat treating.

...This type of Rust Furnace is used by virtually all strip mills in the world for reheating slabs to be rolled into strip steel



THE WHOLE JOB IS ONE JOB WITH A "RUST PACKAGE CONTRACT"

One contract covers everything, from original idea to start-up. Rust assumes responsibility for design, manufacture, erection and initial operation. Rust is prepared to undertake these different phases of the work with its own forces. This results in substantial savings to customers, because of only one overhead and profit, instead of the "pyramiding" which occurs when several contractors are used.

RUST
Rust Furnace Company
Rust Building • Pittsburgh, Pa.
Pioneers in Furnace Design

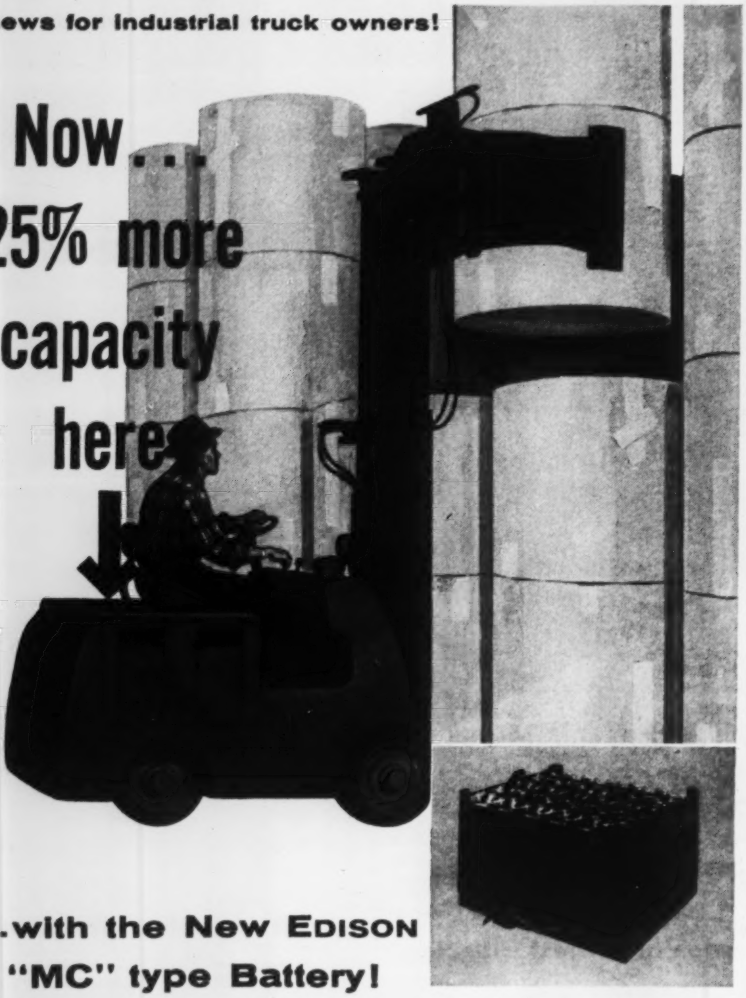
Write for Catalog... 24 pages of Furnace information

Rust Furnace Company

Pioneers in Furnace Design

Rust Building • Pittsburgh, Pa.

F-14



...with the New Edison "MC" type Battery!

Specifically designed to provide more power for modern driver-ride, sitdown fork trucks, this newest Edison battery development provides *25% more capacity* than ever before available in nickel-iron-alkaline batteries . . . to suit the limited battery compartments of such industrial trucks. Extra power too, for operating various hydraulic devices which speed handling in plants and warehouses.

Besides this unusual space-capacity ratio, the new "MC" offers all the profitable features typical of Edison Nickel-Iron-Alkaline Storage Batteries: steel plates and cell containers for rugged, long-life service—electrical characteristics that assure foolproof operation, and outstanding dependability.

And like all Edison batteries, the new "MC" is designed and built to give *more than twice the performance life* of other type batteries. Be sure to investigate this new Edison development today!

**Most dependable power...
lowest over-all cost
you get both with an EDISON**

EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

companies. For a period of one to two years, New Jersey Zinc will carry on exploration work on their extensive holdings in the Blind river district in order to define their uranium mineral resources.

Alta Mold Opens Plant

Alta Mold Mfg. Co. opened a plant at 3415 Ocean Way, Monrovia, Calif., for production of plastics and die-cast molds.

Buys O. S. Peters Co.

Baldwin-Lima-Hamilton Corp., Philadelphia, acquired O. S. Peters Co., Washington, manufacturer of devices for materials testing equipment and electronic specialties.

Olin Changes Plant Name

Effective July 1, the designation of "Western Cartridge Co., Division of Olin Industries Inc." was changed to "Olin Industries Inc., Western Cartridge Plant." Olin Industries and Western Cartridge are located in East Alton, Ill.

Gould-National To Expand

Gould-National Batteries Inc., Trenton, N. J., purchased the Ft. Erie, Ont., industrial battery property it formerly occupied under lease. The company will begin an expansion program soon which will double the plant's capacity.

Larson Building Plant

Charles O. Larson Co., Sterling, Ill., manufacturer of wire hardware, is building a plant east of the city on Route 30. The company will move into the new quarters gradually from its present plant

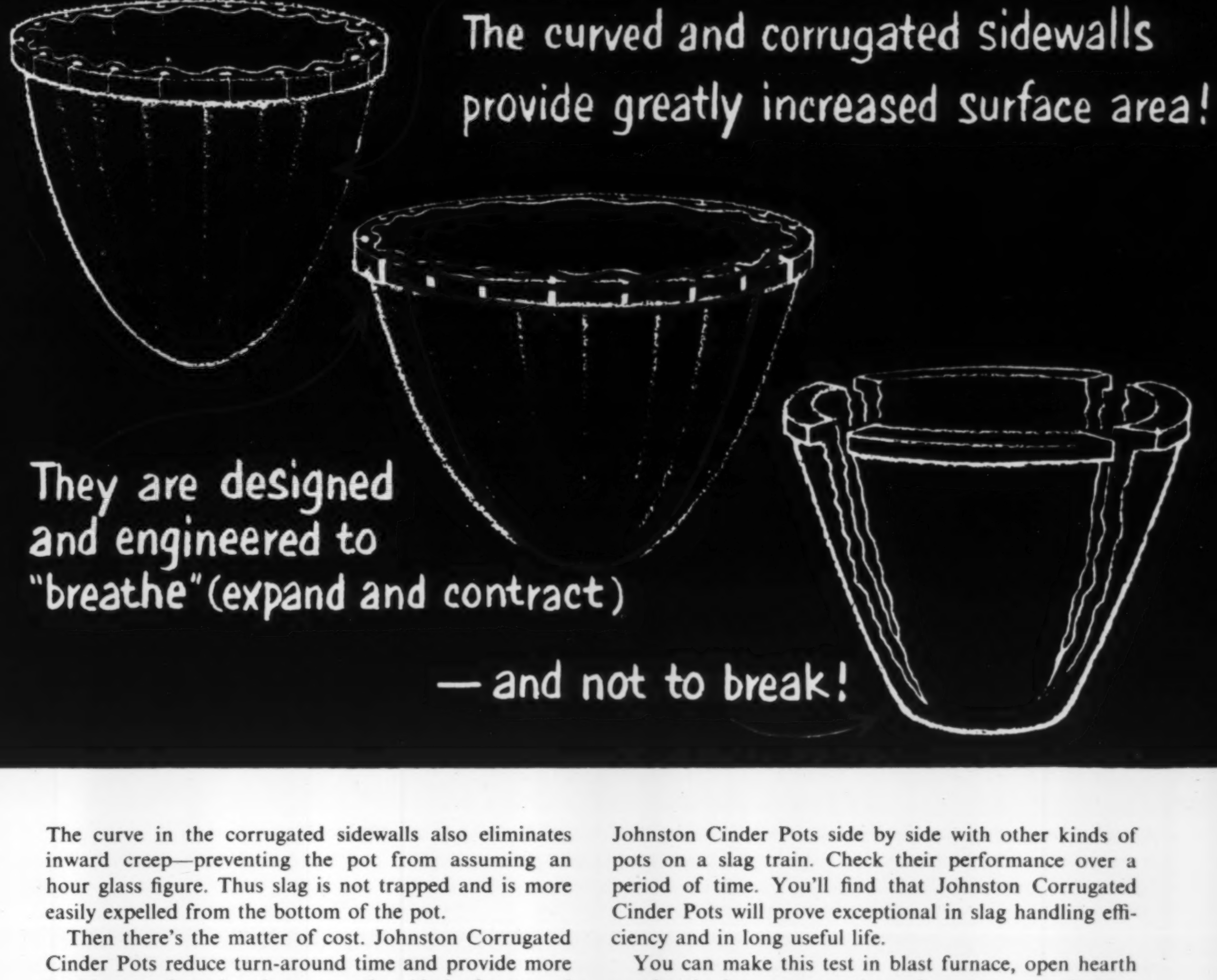
REPRESENTATIVES

Ampco Metal Inc., Milwaukee, appointed Davis Emergency Equipment Co., Melrose, Mass., as a distributor of its safety tools.

Revere Copper & Brass Inc., New York, appointed Baker Steel & Tube Co., Los Angeles, as a distributor of its aluminum tubing.

Union Metal Mfg. Co., Canton, O., named Insley-McEntee Equipment Co., Rochester, N. Y., as its

The principle of JOHNSTON CINDER POTS is as simple as this:


The curved and corrugated sidewalls provide greatly increased surface area!
They are designed and engineered to "breathe" (expand and contract)
—and not to break!

The curve in the corrugated sidewalls also eliminates inward creep—preventing the pot from assuming an hour glass figure. Thus slag is not trapped and is more easily expelled from the bottom of the pot.

Then there's the matter of cost. Johnston Corrugated Cinder Pots reduce turn-around time and provide more heat-hours of service than any other kind of pot, and that means a substantial reduction in slag handling cost.

There is a practical *on the job* test *you can* make: place Johnston Cinder Pots side by side with other kinds of pots on a slag train. Check their performance over a period of time. You'll find that Johnston Corrugated Cinder Pots will prove exceptional in slag handling efficiency and in long useful life.

You can make this test in blast furnace, open hearth or electric furnace operations, ferrous or non-ferrous, because Johnston Cinder Pots are available in a wide range of capacities to suit the requirements.

Write for the descriptive Johnston Corrugated Cinder Pot Bulletin.

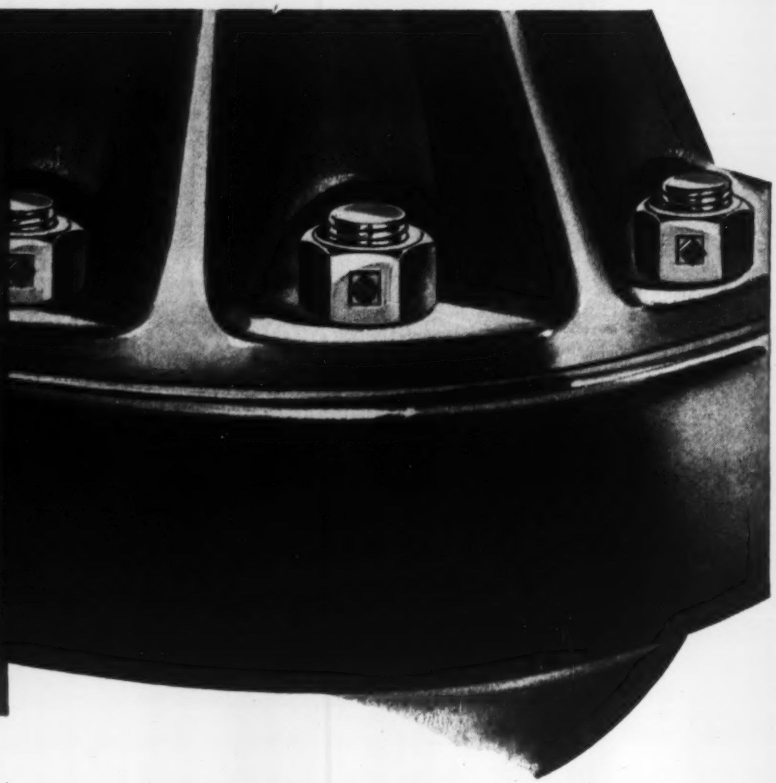
MACKINTOSH-HEMPHILL COMPANY

Makers of the Rolls with the Striped Red Wabblers

PITTSBURGH AND MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: all types of cast mill rolls . . . improved Johnston patented corrugated cinder pots and slag handling equipment . . . Mackintosh-Hemphill rotary straighteners—electronically controlled contouring lathes—screw feed roll turning lathes—heavy duty engine lathes . . . shears . . . end-thrust bearings . . . steel and special alloy castings . . . reversing hot strip mills . . . Y-type cold strip mills

Republic "NYLOK"* Nuts Assure Positive Locking

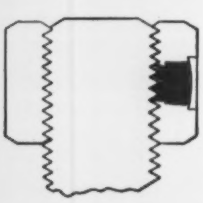


The illustration shows a typical two-piece metal housing. When assembled, a gasket or seal is placed between the two pieces. Republic "Nylok" Nuts are used to assure positive locking even under severe vibration.

These lock nuts go on easily. Either end is up. No special tools, techniques or lubricants are needed to start them. Feed them automatically at full-production speed. Or use them manually for piecework.

Republic "Nylok" Nuts lock whether seated or not. They can be backed off and can be re-used.

Why not investigate the use of Republic "Nylok" Nuts on your product or equipment? Write us for samples, indicating sizes required.



Here's how the "Nylok" principle works

A nylon plug inserted in one of the sides of the cold-forged nut forces the nut tightly against the opposite threads as the nut is turned on.

*U. S. Pat. No. 2,462,603 and No. 2,450,694 and pending applications.

SIZES

Finished Series tapped ¼" through 1"
Finished Thick Series tapped ¼" through ½"
Heavy Series tapped ¼" through 1"

12 WAYS BETTER

Assemble from either end • Can be re-used • Non-galling • Best wrenching characteristics • One-piece • Cold forged • Won't damage threads • No special tools • Lock in any position • No special know-how • No lubricants needed • Ideal for mechanical feeding

REPUBLIC STEEL CORPORATION
Bolt and Nut Division • Cleveland 13, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

REPUBLIC BOLTS AND NUTS

Other Republic Products include Steel and Plastic Pipe, Tubing, Lockers, Shelving — Carbon, Alloy and Enduro Stainless Steels — Titanium

agent in that territory. Union Metal makes container-type materials handling equipment.

Jones & Lamson Machine Tool Co., Springfield, Vt., appointed Rickert Industrial Supply Co., Milwaukee, as a stocking distributor of its automatic opening die heads, chasers and fixtures.

Electric Controller & Mfg. Co., Cleveland, appointed Charles D. McCord & Son Engineering Sales, Largo, Fla., as sales representative for its lifting magnets and motor starting and controlling equipment.

Garden City Fan Co., Chicago, appointed Ohio Blow Pipe Co., Cleveland, as a representative for its exhausters, special heat fans and ventilating fans.

Wagner Bros. Inc., Detroit, appointed as distributors of its electroplating equipment and supplies Moehlenpah Engineering Inc., St. Louis; Reynolds-Robson Supply Co., Philadelphia; and Alert Supply Co., Los Angles.

NEW ADDRESSES

Copeland & Slack Inc. — paints, chemicals and metallurgical research—moved to 16010 Park Ave., Harvey, Ill.

R. K. LeBlond Machine Tool Co., Cincinnati, will move its Chicago district office to 6429 W. North Ave., Oak Park, Ill., effective July 20.

National Association of Manufacturers moved its headquarters office to 2 E. 48th St., New York 17.

ASSOCIATIONS

John E. King, Worcester Pressed Steel Co., Worcester, Mass., was appointed a member of the national board of directors of **Pressed Metal Institute, Cleveland.**

Harold C. R. Carlson, president and chief consulting engineer, Carlson Co., New York, has been nominated to serve as a director-at-

(*Please turn to page* 90)

HOW MANY OPERATIONS WHEN YOU PREPARE STEEL FOR PAINTING?

	Operations
Cleaning	1
Rinsing	1
Pickling	1
Rinsing	1
Conditioning	1
Rinsing	1
Drying	1
Total	3

What's wrong with that addition? How can seven operations add up to three operations?

It's easy when you use Oakite Compound No. 33 (or Oakite Compound No. 31) to remove rust or heat scale *at the same time that* it removes oil *at the same time that* it prepares steel (or aluminum) for the lasting adhesion of paint.

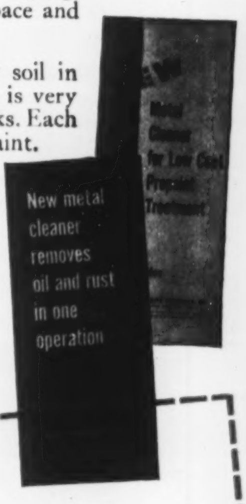
That combines cleaning, pickling and paint conditioning into one operation. After rinsing and drying, you have saved the time, the tanks, the space and the solutions for four operations.

O. C. No. 33 is great for removing heavy soil in tanks or for cleaning by hand. O. C. No. 31 is very economical for removing moderate soil in tanks. Each compound is able to strip certain types of paint.

FREE For booklets describing the specific advantages and applications of Oakite Compounds Nos. 31 and 33, just mail the coupon.

Technical Service Representatives in Principal Cities of U. S. and Canada

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE


New metal cleaner removes oil and rust in one operation
Metal Cleaner for Low Cost Precoat Treatment

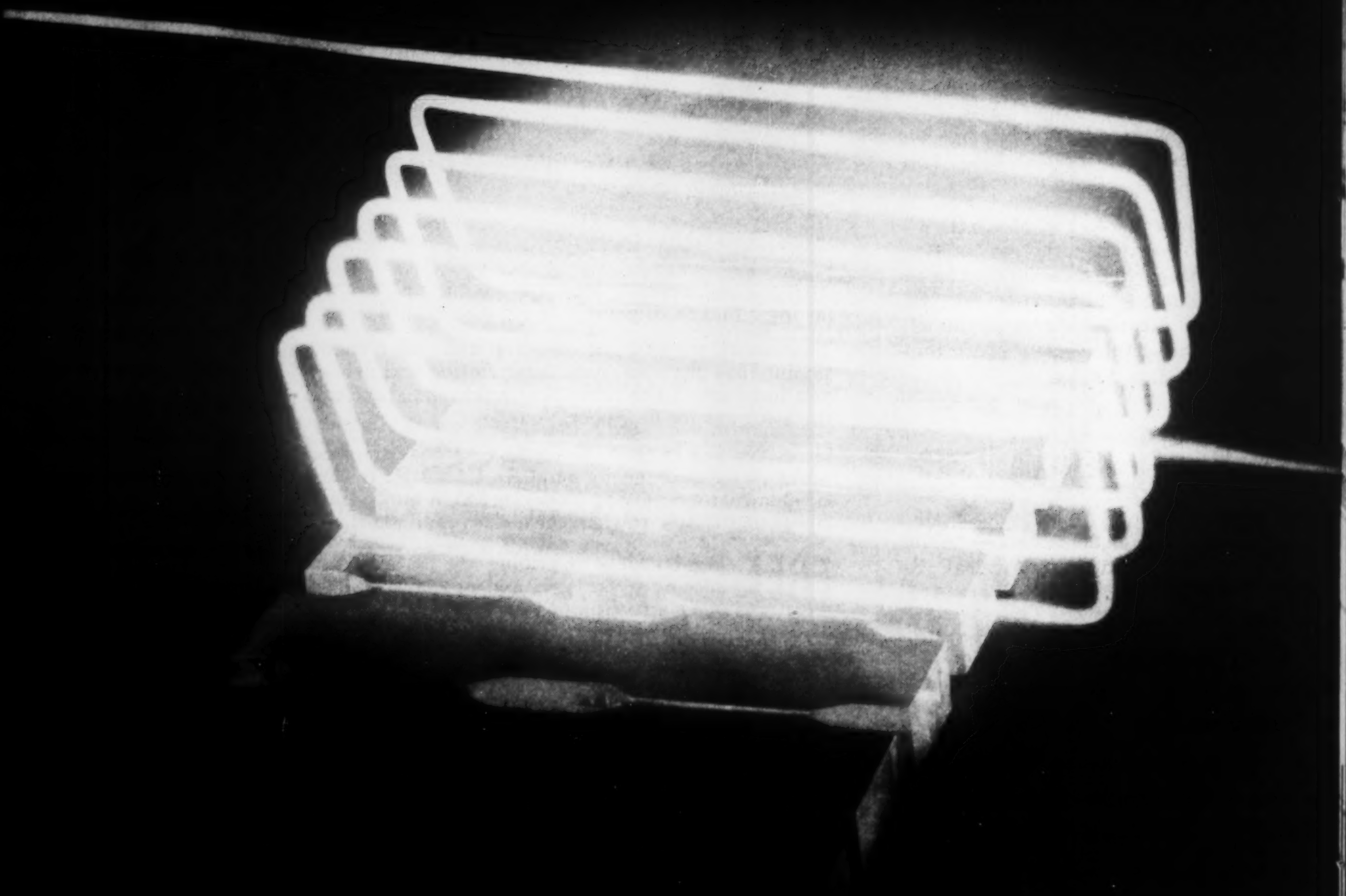
OAKITE PRODUCTS, INC.
34E Rector St., New York 6, N. Y.

Send me your FREE booklets on Oakite Compounds Nos. 31 and 33. I am especially interested in removing the following soils from ( ) steel, ( ) cast iron, ( ) sheet aluminum, ( ) aluminum castings:

☐ Oil and grease
☐ Drawing compounds
☐ Rust preventives
☐ Identification inks
☐ Carbon smut
☐ Paint
☐ Rust
☐ Heat scale
☐ Tarnish
☐ Welding flux
☐ Soldering flux
☐ ____________

NAME ____________
COMPANY ____________
ADDRESS ____________

ANOTHER WESTINGHOUSE FIRST IN INDUCTION HEATING FOR FORGING . .



New Westinghouse coil design handles irregular shapes, puts forging operations into your production line

Another successfully applied Westinghouse development, this new technique brings the cost and production benefits of induction heating to a larger variety of forging operations than ever before.

Proved in actual service, this design solves the problems of heating a workpiece having an irregular cross section. It combines the *sideways feeding* of the workpiece with a specially developed inductor coil, and offers these outstanding advantages:

- Less space required—short inductor coil accommodates many workpieces side by side during heating cycle, yielding savings in production-line length and floor space.
- Heating uniformity—control of current flow in workpiece minimizes variations in heating normally caused by irregular contour.
- Greater efficiency—less exposed workpiece area means less radiation loss. Better coupling is possible on irregular-shaped workpieces.

This new process—as well as additional ones shown at right—offers greatly increased opportunity to cut costs, speed production and improve quality in your forging operation.

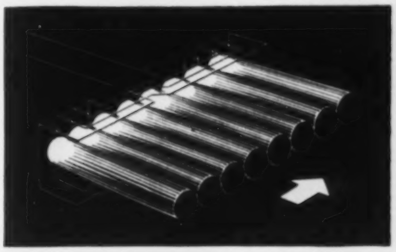
Put Westinghouse induction heating to work for you . . . NOW!

Whether your forging involves regular or irregular shapes, selective or over-all heating, Westinghouse can engineer and build the right and *complete* setup to solve your production problems. Call your local representative or write: Westinghouse Electric Corporation, Induction Heating Section, 2519 Wilkens Avenue, Baltimore 3, Maryland.

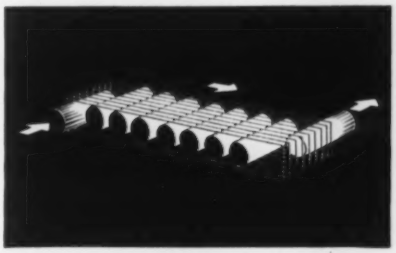
J-02288

YOU CAN BE **SURE**...IF IT'S
Westinghouse

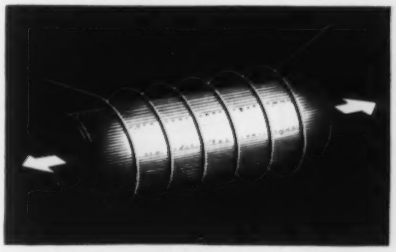
•Skilled application backed by long experience is the key factor in Westinghouse ability to make induction heating handle your individual problems. Below are three methods often used:



Lateral Feed—Bonnet Coil—Typical application: Heat 2 inches of the end of a ⅝-inch machine bolt blank to forging temperature at a production rate of 1750 pieces per hour. Adaptable to wide variety of shapes and sizes and "in-line" production.



Traverse Feed—In-Line Coil—Typical application: Through heat to forging temperature a 1 7/16-inch diameter, 13-inch long billet at a rate of 900 billets per hour. Gives maximum efficiency in heating long workpieces in greatly reduced floor space.



Coaxial Feed—In-Line Coil—Typical application: Through heat to forging temperature a 3¾-inch long, 2½-inch diameter billet at a rate of 1440 billets per hour. After heating, piece may be retracted, or pushed straight through coil for "in-line" production.

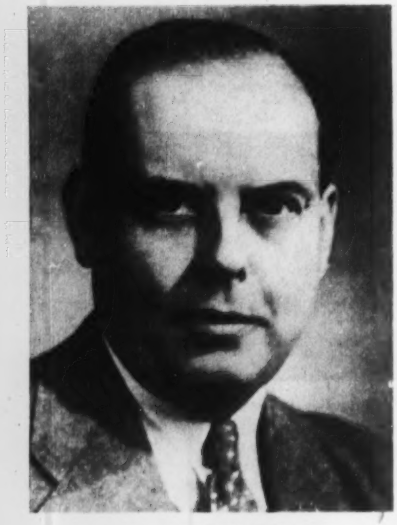
INDUCTION HEATING FOR
HARDENING • JOINING • ANNEALING
FORGING • HEAT-TREATING

(Concluded from page 87)

large of **American Society of Mechanical Engineers**, Pittsburgh.

Foundry Equipment Manufacturers Association, Cleveland, plans to move its headquarters to 1 Thomas Circle, Washington, on Aug. 1. W. B. Wallis, Lectromelt Furnace Corp., Pittsburgh, is president of the association. The Washington office will be under the supervision of C. R. Heller.

Alloy Casting Institute elected as its president C. K. Lockwood, vice president of Stainless Steel & Alloys Division, Shawinigan Chemicals Ltd., Montreal, Que. He succeeds G. A. Baker, vice president of Duriron Co. Inc., Dayton, O. Thomas Rutherford, Midvale Co., Philadelphia, was elected vice president of the institute, while E. A. Schoefer, Mineola, N. Y., was re-elected executive vice president and treasurer.



C. K. LOCKWOOD
. . . pres., Alloy Casting Institute

Three new members were named to the institute's board of directors. They are: C. M. Ruprecht, president, American Brake Shoe Co.'s Electro-Alloys Division, Elyria, O.; B. B. Evans, sales manager, Empire Steel Castings Inc., Reading, Pa.; and J. D. Hagans, sales manager, Ohio Steel Foundry Co., Springfield, O.

National Association of Fan Manufacturers Inc., Detroit, elected the following officers: President, R. W. Nelson, American Air Filter Co. Inc., Louisville; vice president, C. C. Cheyney, Buffalo Forge Co., Buffalo; honorary vice president, J. M. Birkenstock, Green Fuel Economizer Co. Inc., Beacon, N. Y.; and secretary-treasurer, G. W. McCormick Jr.

F. H. Atwood, vice president of Harbison-Walker Refractories Co., Pittsburgh, was re-elected president of **Refractories Institute**, that city. F. H. Laube Jr., executive vice president, Freeport Brick Co., Freeport, Pa., was elected treasurer.

ANNIVERSARIES

Allmetal Screw Products Co. Inc. is celebrating its 25th anniversary this year in its new plant at 821 Stewart Ave., Garden City, Long Island, N. Y. The firm makes bolts, nuts, screws, washers, rivets, keys, pins, studs and other products of ferrous and nonferrous metals.

VACATIONS

Whiting Corp., an affiliate of **Swenson Evaporator Co.**, will close its main plant at Harvey, Ill., and its branch plant at Norwalk, Calif., on Aug. 2 through Aug. 15 for vacation. A skeleton force will be maintained during the vacation to handle emergency orders and incoming material.

A physical inventory will be taken in **General Motors Corp.'s Allison Division** plant 5 in Indianapolis during the period of Aug. 2 to Aug. 14, inclusive. The plant will not be in a position to handle receipts of material after Wednesday, July 28 until Aug. 16. The firm's **Electro-Motive Division** in La Grange, Ill., is shutting down most of its operations in July. Normally the division closes for a two-week inventory period, but this year it will merge inventory-taking and vacations. The division plans to operate its "locomotive rebuild" facilities during the last half of the month and may decide to operate them during the inventory-taking period.

6

STEEL's 1954 Management Series . . .

The editors of STEEL herewith present the sixth in their ten-part series, Program for Management for 1954. The complete list:

1. **Now You Have To Sell** (Feb. 22, p. 91)
2. **Build Better Bosses** (Mar. 22, p. 81)
3. **Automation—How Far Should You Go?** (Apr. 12, p. 87)
4. **Stabilizing Production, Employment** (May 17, p. 87)
5. **Integrate Your Distribution** (June 21, p. 113)
6. **Personnel in Distribution**
7. **Transportation in Distribution**
8. **Product Diversification**
9. **Foremen—Bridge to More Efficiency**
10. **Product Design**

Reprints Available

If you want reprints of this and the other articles on distribution, write STEEL, 1213 W. Third St., Cleveland 13, O. The first one appeared June 21. The next one, on transportation, will run Aug. 23.

No. 6 in 1954 Management Series

STEEL

TRANSPORTATION IN DISTRIBUTION
INTEGRATE YOUR DISTRIBUTION

Personnel In Distribution

How To Use Them Better

A PROGRAM FOR MANAGEMENT IN 1954

SEVENTEEN MILLION persons are taking part in a revolution.

But there's no cause for alarm. The revolutionists in this case perform America's $100-billion annual distribution job—the selling, advertising, servicing and transporting required to move goods from the point of manufacture to the point of sale. Those product plotters have been at it hot and heavy, especially since the end of World War II.

Background for Revolution — And many students of business think they may be doing just what the doctor ordered. In their opinion, we need a revolution in one form or another about once every 50 years to keep prosperous. So far we've been on schedule.

In the early 1800s, the nation's emergence as a separate and independent political being fostered economic growth. In the late 1800s, railroads welded the country together to make possible sensational business expansion. In the early 1900s the invention and development of the automobile provided the stimulus.

Now we're due for new magic. It could come from atomic energy and other developments stemming out of research. Or from political changes that lead to new world unity and economic prosperity. Or, as indicated, from distribution changes.

Take Your Choice—Research is a promising catalyst, but its bombs could send us into an economic fizzle as readily as new growth. World unity that would spur great economic development is an intriguing possibility, but it has been an unrealized dream for centuries and now is as far from achievement as ever.

The practical choice, many economists agree, narrows down to distribution.

The depression of the 1930s was a warning sign that we needed new techniques for distribution, but constructive plans in that direction were delayed by the emphasis on production during World War II and the Korean stalemate.

Opportunity—Now, the time is ripe for new emphasis on distribution. In fact, a lot of imaginative spadework has already been done, particularly at the retail levels—self-service stories, giant shopping centers, consumer goods packaging. Manufacturers lag behind.

But the latter show signs of perking up. A STEEL survey of some 5000 metalworking companies reveals that about 70 per cent of the respondents expect to take positive steps to broaden their markets and cut their costs through better distribution in 1954.

Comments—At least one competitor credits General Motors Corp.'s outstanding distribution techniques for the corporation's success.

A maker of fasteners increased

Tinnerman Products Inc

17 MILLION WORKERS . . .

OCCUPATION	NUMBER
	All Workers
Sales and Clerical	4,690,000
Proprietors and Managers	3,000,000
Service Workers	2,700,000
Deliverymen, Attendants and Operating Personnel	2,350,000
Transportation People	2,000,000
Craftsmen and Supervisors	1,450,000
Professional	475,000
Manual Laborers	335,000
Total in Distribution	17,000,000

Estimates by STEEL based on U. S. Chamber of Commerce figures

his volume by improving his packaging, a factor in distribution. A producer of industrial rubber goods was underselling some of his competitors, not because of improved manufacturing techniques, but because he found a way to cut distribution costs 5 per cent.

Retailers and wholesalers know that distribution costs money, but manufacturers often tend to forget it. On many consumer durable goods, distribution accounts for half the retail sales price. The farther away from the end-item classification a product gets, the lower becomes its distribution cost. But even for the basic fastener, the distribution cost is at least 15 per cent of the selling price.

Getting Started—More manufacturers are now saying, "O.K., I'm convinced. But what do I do to improve distribution to cut costs and broaden markets?"

Five major techniques are available: More efficient selling, better marketing research, improved integration of distribution and manufacturing functions, a new approach to the physical movement of goods from the production line to the buyer and better utilization of personnel in distribution.

The first three techniques have been discussed in earlier articles in STEEL's Program for Management (selling, Feb. 22, 1954, p. 91; marketing research, Dec. 7, 1953, p. 125; integration, June 21, 1954, p. 113). On Aug. 23 developments in the physical movement of goods will be outlined. The remainder of this article deals with the better utilization of distribution personnel.

Proof—Inland Steel Co. Chairman Clarence B. Randall says: "Manpower is our greatest resource." A survey by the Chamber of Commerce of the U. S. reveals that personnel is one of the top three distribution problems in 1954. STEEL's canvass of 5000 executives shows they consider personnel utilization the No. 1 challenge in distribution.

The ranks of the nation's distribution department have swelled 43 per cent since 1940. The number of manufacturing personnel has increased 40 per cent. Distribution today is attracting new faces at a rate faster than almost any other segment of our economy. With that gain and with the changes going on in distribution, no wonder personnel are not used with full effectiveness. What can you do to improve the utilization? Here are eight suggestions:

Who's Boss?

Practically every company in the U. S. has an official who functions as vice president in charge of manufacturing. But how many have one who is in charge of distribution? The sales manager or vice president usually comes the closest to filling that role, but he rarely has responsibility for more than sales, advertising and marketing research. Somebody else, who may have no connection with the top sales official, supervises traffic management, warehousing, packaging, even personnel training—all functions of distribution, too.

Case in Point—A New Jersey manufacturer last year combined all distribution functions under the control of one man. This year sales are running 5 per cent above last year's levels, although most competitors are losing ground by as much as 20 per cent. That company made its sales vice president the head man on distribution and called him vice president for distribution. It created new titles and named assistants as sales, advertising, marketing research and traffic managers to define better the jobs of the major functions for which the new distribution vice president was responsible. The firm also carefully defined the areas in which other department heads, notably the personnel manager and the purchasing director, were responsible to the veep for distribution.

In all large and in most medium-sized organizations, no one man can personally run the whole distribution program, just as no one man can personally direct all the

$55.4 BILLION PAYROLL IN DISTRIBUTION

	MEN			WOMEN	
Number Employed	Av. Annual Income	Payroll (millions)	Number Employed	Av. Annual Income	Payroll (millions)
2,150,000	$3,680	$ 7,912	2,540,000	$2,245	$5,703
2,400,000	4,890	11,736	600,000	2,645	1,587
1,600,000	2,710	4,336	1,100,000	1,610	1,661
1,750,000	3,335	5,836	600,000	1,900	1,280
1,500,000	3,795	5,793	500,000	2,115	1,038
1,400,000	3,910	5,474	50,000	2,300	115
400,000	5,060	2,024	75,000	2,760	197
300,000	2,300	690	35,000	1,555	55
11,500,000	$3,810	$43,801	5,500,000	$2,115	$11,636

Grand average annual income per worker: $3,261

facets of production. So, most distribution executives must delegate authority.

Four-Point Program—As a distribution executive you should do four things to keep on top of the job: Delegate as much authority as possible; develop a top-flight executive assistant to handle details; know the functions and responsibilities of distribution; budget time as well as money; and find a Shangri-La to which you can vanish with accumulated projects, unfinished items and suggested innovations.

Costs and Personnel

"We know precious little about distribution costs," complains Edward F. Howrey, chairman of the Federal Trade Commission.

If you have ever tried to pin down your distribution costs as closely as you can your manufacturing charges, you will have to agree with him. We know to the fraction of a penny what it costs to produce each of 10,000 widgets, but we are fortunate to know even approximately what it costs to distribute each of them.

Challenge—Here is a second way personnel can be better utilized. Distribution personnel spend the money moving the product from the point of manufacture to the point of sale. Why shouldn't they use a sharper pencil on these costs?

If you know what those costs are, you can better budget your money, learn where you are spending too much or too little. Shakeproof Division of Illinois Tool Works made such a study and found, among other things, that it was not putting enough sales emphasis on some of its best profit lines. Its cost studies also revealed it needed to revise its setup for distributors to get more volume. At the moment that change means higher-cost selling, but in the long run it will add up to higher sales and lower unit costs.

Matter of Money—Distribution personnel can also do more to cut down on the number of distribution dollars spent. On the manufacturing side of our economy, it's axiomatic that one of the jobs is to cut costs. That tradition is not so ingrained on the distribution side. Willis E. Morgan, vice president in charge of marketing for Burroughs Corp., says: "The major problem in reducing distribution costs is people." He points out that, "right now production costs are going down, but distribution charges are going up. The best way for industry to cut costs today is in distribution. The problem is to stimulate the distribution staff to save money, just as the manufacturing staff has long been so stimulated."

To do that job of stimulating, Mr. Morgan advises this:

1. Modify your organizational setup. Burroughs decentralized to create eight regional offices and to give more authority to 141 district offices. Job responsibilities and authorities were written out. The accountability for distribution costs was placed where the costs were incurred.

2. Budget your distribution expenditures. Use more marketing research, make sales forecasts. The budget should not be a straitjacket, but it should be a road guide. The budget forces all levels of management to agree on plans. It gives a sense of unity to distribution plans.

3. Get more agreement on budget plans. Start early to get field consultation and agreement.

4. Reduce performance into figures to see how that compares with the budget forecast. Hold monthly budget meetings to coincide with marketing reports. Face-to-face discussions are important.

5. Shift your thinking from quota performance to cost or profit performance. Compensation should be keyed to profit performance of individual divisions, not on volume of goods distributed. Burroughs is now shifting to that concept.

Motivating Men

Donald D. Couch, vice president-sales for American Radiator &

WEAK POINT . . .

Supervisory Training

Of 347 supervisors of salesmen . . .

91.6% HAD LITTLE OR NO TRAINING

30.0 % had no training before taking supervisory job

61.6 % had brief orientation of duties

1.3 % had less than 3 days

2.6 % had less than 1 month

4.5 % had about 1 year's previous experience in some type of staff or line executive job

79.8% WANT MORE TRAINING

12.6 % would not have wanted additional training

7.6 % were undecided

29.9% RECEIVED NO TRAINING SINCE BECOMING SUPERVISORS

61.7 % received some training since becoming supervisors, but not enough

8.4 % received enough training since becoming supervisors

Source: Dr. Charles L. Lapp, business consultant and associate professor, Washington University

Standard Sanitary Corp., agrees with Mr. Morgan that "profitability is the basic measurement of distribution's effectiveness." But he cautions that use of that standard alone is not enough to improve distribution.

That brings up the old question: What motivates men? Answer that, and you'll have the third major technique for improving distribution.

Seven Keys—Paul R. Larimer, general sales manager, Ansul Chemical Co., presented these seven keys at an American Management Association conference on marketing last January:

1. Fair compensation. That's the most obvious motivating force, but it often is not the most important. "If your compensation plan is fair—and today most have to be to hold men," says Mr. Larimer, "you should look deeper in a majority of cases when a man talks continually about dissatisfaction with his income."

2. Personal recognition. He recommends establishing methods within your organization to insure that each person's efforts and interests will not pass unnoticed.

3. Participation. Devise ways of getting as many as possible of your distribution force to participate in plans and decisions, advises Mr. Larimer. The most obscure shipping clerk can be made to feel that he belongs if he is consulted in some transportation problem, no matter how simple.

4. Understanding the individual's problems. A smart manager of distribution can weed out those personal problems on which he can help. Distribution personnel, especially salesmen, want help on business problems, too, but many men will not ask for it for fear they will expose damaging ignorance. Your motivation program must include ways and means, under a nonthreatening atmosphere, for frank discussion of all problems.

5. Confidence in the boss. A man should be able to understand the reasons why he is asked to operate in a certain manner, says Mr. Larimer. Men and women do not like to work for supervisors who do not understand the jobs they are assigning—or who will not fight for and defend their men when the latter are in the right.

6. Product respect. Distribution people, but especially salesmen, must understand their product technically, all its applications and how it fits into our economy. Distribution people must feel that they are rendering a service, that the product is needed and gives real benefits to every purchaser.

7. Opportunity. "Let your distribution people visualize the ever-widening scope of activities that can be handled only by men with sound experience and performance," advises Mr. Larimer.

From the Top Down—Motivation must start from the top and work down through an organization. Don't expect less experienced men to catch fire unless they see all others with greater distribution responsibilities enthusiastic and anxious to do a better job.

Some distribution experts point

HOW TO IMPROVE

Training of Distribution Personnel

1. **Get general management approval and interest in the training program.**
2. **Be sure that the budget for training purposes is adequate; be generous.**
3. **Select the right people to do the training.**
4. **Give training to the trainers because the teachers are all-important.**
5. **Arrange so that distribution management participates in some of the training.**
6. **Keep checking on your results so that bad points of the program may be found and corrected.**
7. **Have a continuous program for new personnel and a periodic retraining program for more experienced personnel.**
8. **Pick and train potential supervisors.**

out that a serious difficulty in salary schedules commonly turns up when the sales force scales are above those in other areas of distribution — or manufacturing.

Training, Performance

Students of distribution point out that the salesmen also get more training than other types of distribution personnel.

Nobody suggests that salesmen should get less training; indeed, more intensive education for the sales force and more general training for all other types of distribution personnel is the fourth major way you can better use your greatest resource, people.

Proof Positive—The table on p. 94 showing findings by Dr. Charles L. Lapp, associate professor of marketing at Washington University, reveals that even in selling the training of supervisors is woefully weak. Dr. Lapp, also a sales consultant, says 91.6 per cent of all sales supervisors queried either had no training at all or the briefest orientation.

What's more, the prospect for the future is even less promising. Only 83 industrial product salesmen of 1086 interviewed had been given any training to prepare them for supervisory jobs in the days ahead. Only 83 immediate superiors of salesmen out of 175 had been prepared to take over higher jobs. If that's the training situation in an area where training has already been comparatively intense, imagine the supervisory and basic needs in traffic, advertising and marketing research functions where, most observers agree, the educational job has been far less extensive. As much attention has gone to sales training as it has because the need there is the most obvious and because sales personnel are being hired more rapidly than any other type of distribution personnel. We have 25 per cent more salesmen now than in 1939.

The Job Ahead—The Chamber of Commerce estimates that 10 per cent of today's 17 million in distribution are still inexperienced, or in a period of training, a higher ratio than exists in manufacturing. It's costing about $1.5 billion a year to train them, also relatively more than it's costing in manufacturing.

What can you do to help spend that $1.5 billion more effectively? One approach is to study some of the techniques used to train production employees—high-caliber supervisors, movies to show how the job should be done, arrangements with neighboring colleges or high schools to handle some courses.

Extending the Benefits—Another approach is to extend your sales training to other distribution personnel or to adapt the training schools of other organizations to your own purposes if you have none yourself.

Carborundum Co. is one of many companies with an outstanding sales training program. Carl H. Demmin, the manager of the course, says that the company was faced with the dual problem of training more salesmen better and of reducing training costs. It achieved those apparently opposed objectives by reducing the home office training period and increasing the field sales training time.

The Mechanics—The old home office training span of 14 or 15 months was reduced to nine or

Service Sells

SCHOOLS LIKE THIS ONE, conducted by North American Philips Co. Inc.'s Research & Control Instruments Division at Mount Vernon, N. Y., are becoming more numerous.

The selling in most of them is indirect; the accent's on service and education. Experience shows that service is a fine salesman, an effective way to use your personnel.

At this school more than 150 potential customers from industry, research organizations and educational institutions showed up for courses which included lectures by prominent scientists and laboratory sessions where latest x-ray analysis techniques were demonstrated.

ten. That was accomplished by eliminating product knowledge that had no direct bearing on product application and by reducing periods of training in specific applications. Now about 10 or 15 per cent of those 14 or 15 months is spent on basic sales training, about 25 per cent on field training and 60 to 65 per cent on product knowledge. In the field, the trainee, working with a senior salesman, spends three months instead of three weeks. After the first week or two, the trainee is on his own under the direction of the senior man. He then works with distributors, is assigned small accounts for reappraisal, makes missionary calls and works after hours with the senior on planning future calls and discussing problems.

Carborundum tried the revised training plan in four areas in 1953. Trainees who participated currently are among the top 20 per cent of the salesmen who have met their quotas. For the cost-cutting objective, the company saved $14,000 yearly. It achieved a $700-reduction per man for the 20 men it trains annually.

An Omission—Lots of companies may train their own direct employees, but how many train the employees of agents who sell their products, or of railroads that ship their products or of warehouses that store their products? Training the employees of independent agents who handle your product is largely an extension of the training of your direct employees.

Polyken Products, a department of Kendall Co. that makes pressure-sensitive tapes, has developed a distributor clinic program to educate distributor salesmen in all possible uses for its industrial tapes. Walt Marsh, president of Marsh Stencil Machine Co., believes that the manufacturer must service the distributors—keep them aware of what the product can do, keep them enthusiastic about the opportunities for the product.

James B. Griffin, superintendent of traffic for Scovill Mfg. Co., thinks that part of a traffic manager's job is to help educate truckers and railroaders on how to reduce shipping damage and on how to load, unload and handle the product.

Does Training End?—Actually, training of any personnel never should stop. Some companies have a regular retraining school, especially for salesmen, every five or six years. But once the basic training is over, watch that you don't overtrain. A distribution man can get as stale as an athlete from too much warming up, warns C. W. Blount, vice president, Bakelite Co.

Special Problem—The trend for companies with complex products and diverse lines is to train distribution men on only some of the products, just as most production men work on only a few lines. That's particularly applicable to salesmen. Burroughs had all its salesmen handle all its products two years ago. Now, 90 per cent of the sales force carries the full line. Two years from now, the company hopes to have the percentage down to 50 to 60.

Turnover, Recruiting

Once you have your distribution people trained, how do you keep them from quitting?

Robert Zinn, vice president-sales for Standard Register Co., maker of business forms and systems, says that it costs his company $6500 to break in a new salesman. There are few figures available on other

Sales Shortcut

"IN TWO DAYS we gained as many topnotch business prospects as one good salesman gets over a four-year period."

That's the observation of one large optical equipment manufacturer after the two-day Cleveland Quality Control Show sponsored by Production Service Co., a Cleveland manufacturer's agent. There, certainly, was efficient use of personnel.

Industry is turning more and more to supermarket adaptations to sell industrial products. The psychology is: Let the customer see for himself, and he'll buy. That was the case at this "little metal show" where $101,052 worth of equipment was sold as a direct result of the affair. Only the eight companies which Production Service represents displayed their wares. Costs of special shows aren't prohibitive either. Expense for this one: $5600.

types of distribution personnel, but the costs would be high. So, a fifth important way to utilize better your distribution personnel is to cut turnover and improve recruiting methods.

Steady—Mr. Zinn says that you can reduce personnel turnover through better selection and placement, adequate training, equitable compensation, improved internal communications and high-caliber supervision. When a new man quits, it's usually because he has been badly selected or badly trained. When an older man leaves, it's usually because of a communications failure or incompetent supervision. Many students of distribution agree that inequitable compensation is rarely the sole reason for a man leaving.

Mr. Zinn points out that some turnover is good. It helps in the cross-fertilization of ideas. It stimulates management to find out what it's doing wrong. But the earlier it happens, the better for both the individual and the company. At Standard Register, 93 per cent of those who leave do so within their first two years.

Recruiting—Since you will always have some turnover, you will always have the job of recruiting. You will get your men from a dozen different sources, but the best one for the best young men and women is the college campus (see STEEL, Apr. 26, p. 66). The cost of recruiting a college man can be as low as $50.

Service with a Smile

A New England equipment manufacturer says: "We don't sell. We service."

A growing responsibility for distribution is service. A sixth way to use your distribution personnel better is to make them aware of that and to use more of their time for service.

The Service School—Firms like DeVilbiss Co. make a big thing of their service schools. The maker of spray-painting equipment and systems teaches the consumer through a series of courses on how to use the equipment. Other firms may not have schools for customers, but they teach their salesmen shop practices and point out typical plant difficulties that may require the salesman's on-the-spot solution if he expects to make or keep a sale.

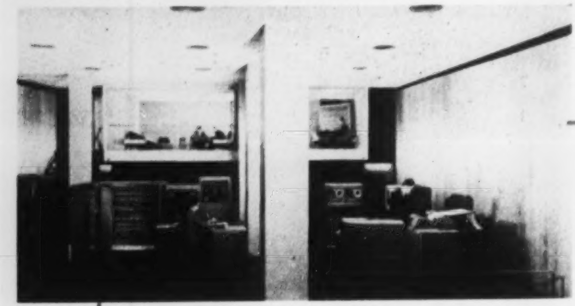
An Ohio manufacturer of drawing compounds sells almost entirely on his skill at solving the special problems of stampers. Machine tool builders know well that service is all important.

Putting Self in Service

Self-service, even for manufacturing, is yet another way that distribution personnel may be better utilized.

In food retailing a metamorphosis has already occurred. Back in 1932 there were 300 self-service food stores doing less than 1 per cent of the national food volume. Today, there are 14,000 supermarkets, plus 76,000 self-service superettes, doing 75 per cent of the national total.

Limitations—You can't sell machine tools in a supermarket—or can you? Harrington-Wilson-Brown Co., a machine tool distributor, has set up a permanent display of equipment in operation at its Mount Vernon, N. Y., headquarters. General Sales Manager John H. Daum says, "We now have something more than catalogs to show customers. They want to see the machines in operation and see what they can do." The first day



Mechanize Those Dreary Jobs

THE OFFICE EQUIPMENT manufacturers are doing miraculous things these days to take the drudgery out of order processing, inventory control, marketing research tabulations and many other functions of distribution.

Take this IBM electronic data processing machine. It can multiply and divide more than 2000 times a second and can add and subtract more than 16,000 times a second. While solving a typical problem, the calculator is capable of performing 14,000 mathematical operations a second.

Installations like this are now beyond means of the average company. But they won't always be. Simplification and cost-reduction are going on constantly. Nearly $3 billion worth of office equipment is already being used to mechanize America's distribution job. More is coming to take more of the drudgery out of distribution.

the exhibit was opened last fall, nearly all of the 34 machines on the floor were sold. S & S Machinery Co., tool importer, set up a permanent exhibit in Brooklyn last October. In the first two weeks of its exhibit, more than $250,000 worth of equipment was sold.

Obviously, you can't sell metalworking products precisely the way you do food, but industry is adapting self-service techniques to its own purposes. There are more "little metal shows" now set up by a manufacturer or distributor for a week or two to allow potential customers to see for themselves what equipment or components can do. Production Service Co., a manufacturer's agent in Cleveland, held one last winter to display the quality control equipment it handles. Kenilworth Steel Co., a warehouse firm at Kenilworth, N. J., invited customers in May to see for themselves the services it offered.

Advertising Self-Service—Advertising also functions as a way of boosting self-service and of increasing the efficiency of distribution personnel. It can pave the way for your salesman, make more efficient their use of time. It now costs about $20 (on the average) for each salesman's call. Advertising can probably be used more extensively and effectively than it is even now. In 1952 the nation's advertising budget was $7.2 billion, or 2.5 per cent of the national income. In 1940 it was $2.1 billion or 2.6 per cent of the national income. In 1933 it was $1.8 billion or 3 per cent of the national income. Men like Under Secretary of Commerce Walter Williams think that current advertising spending may be too little.

Easing Drudgery

An estimated $4 billion is spent annually on paperwork involved in the distribution of all U. S. products.

In the realm of mechanization, the manufacturing segment of our economy is as up to date as tonight's newspaper. But in distribution we are still reading a sheet from the 1920s.

Encouraging Signs—Yet a trend toward improved mechanization and streamlining distribution's red tape is discernible, indicating the eighth major way to use people better. Probably nearly $3 billion worth of office equipment is already used in U. S. distribution.

A St. Louis wholesaler, for example, has installed a complete new business machine setup, one of the most modern ever devised for his type of operations. The installation costs him only $700 a month. He figures that the services of 17 persons, whose total monthly salary is more then seven times the cost of the equipment, can be freed for other work. Think of the savings if some of the 2 million clerical employees in distribution could be freed for other jobs.

Backyard Frontier

People make revolutions. Some 17 million of them are working on one in distribution. As in any such movement, there are weaknesses, maladjustments and distortions in this one.

People can correct those failings—if they become aware of what some of the difficulties are. The most serious ones are in selling, marketing research, integration of manufacturing and distribution, transportation and utilization of personnel.

You, too, can be a revolutionary by helping to solve some of those problems. You can be a trailblazer to help discover a new industrial frontier in your own backyard.

WICKWIRE
ROPE
A
CF&I PRODUCT

Wire rope? What's that got to do with us?

A lot more than you might think, folks. Consider, for example, the heating in your home . . . the warmth that keeps *her* snug and comfortable through a wintry night. Whether you use coal, oil or gas—wire rope is an indispensable part of the equipment that probes the earth's depths to bring this comfort to you. Chances are, it may be Wickwire Rope. Because for over half a century Wickwire Rope has been an outstanding favorite with men in the mining and petroleum industries. Like users in numerous other lines of business, these men know that for unfailing performance, longer life and more economical service—there's nothing to match the quality and care that go into the making of WICKWIRE ROPE.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver
Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland
Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga
Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

1792

WICKWIRE ROPE
CFI PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

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Take a good look at the three views of the Cleveland 350-ton, two-point press shown here. Check the many Cleveland design features for better operation. Most of these same features are available on all 11 types of Cleveland's complete line of presses. Study them and see why you'll profit by installing Clevelands.

RUGGEDNESS—This Cleveland features the four-piece tie-rod type of construction. The bed, crown and two uprights are securely held together by four steel tie-rods that have been heated to the correct degree and allowed to shrink into place. These rods not only hold the four sections rigidly together but take up the stress which otherwise would be transmitted directly to the frame as in one-piece type of press construction.

ACCURACY—Cleveland slides are fitted with extra long bearing surfaces. These insure accurate guidance throughout the entire slide stroke. For lasting accuracy the gibs can be adjusted to eliminate undue play between gibbing and slide-bearing surfaces.

ECONOMY—The trouble-free (patented) Cleveland Drum Type Friction Clutch and Brake provides instantaneous slide control at all times. This unit needs little maintenance and is readily accessible. Costly down-time due to clutch failure is practically eliminated. Lightweight construction and cool running design offer power savings.

SAFETY—The powerful, spring-loaded, clutch brake brings the slide to an immediate stop in event of electric or air supply failure. For added safety the flywheel is equipped with an auxiliary air brake which brings it to an immediate stop when power is shut down.

SPECIAL FEATURES—As shown here, this Cleveland is equipped with two safety blocks for use during die setting. These blocks are tied into the control circuit by safety plugs. When blocks are removed from their storage position in press base, the control circuit is made inoperative. For added convenience the die area is lighted from both sides by lights recessed in the uprights. Centralized lubrication not only assures better operation but greatly reduces maintenance-time.

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CITY FOUNDRY DIVISION • SMALL TOOL DEPARTMENT

STEEL

July 19, 1954

Technical Outlook

DUCTILE IRON DIES— You can cast them close to final contour, hand finish, then harden and temper or flame harden. That's the report coming from North American Aviation Inc., after completing a one-year test. A joggle die, for example, was made in 52 hours. It's estimated it would take 160 hours to do the same job starting with a solid block of tool steel. Among conclusions: The material is excellent for tooling. It combines the castability and machinability of cast iron with the strength and versatility of steel.

SCALE GOES— The problem of scale formation on heating surfaces is being attacked in a new type evaporator. Revolving stainless steel wipers maintain clean non-scaling heat-transfer surfaces, speed up evaporation by spreading a thin film of liquid over heat surfaces and produce turbulence. Back of the development is Dresser Industries Inc., Connersville, Ind.

WELDING IDEA— Ever try permanent magnets to position components? One company uses them in the assembly of fans up to 7 feet in diameter. Fixture is a 16-inch circular steel plate at the center of crossed I-beams. Plate has 58 permanent magnets (each 11/16 inch in diameter). Vane hubs hold rigidly when placed on the plate, while blades are welded in between hub and outer ring. Fixture takes work up to 82¾ inches in diameter.

AUTOMATION— The day of automatic gear production lines may not be too far off. A gear selector, product of Michigan Tool Co., Detroit, has been developed to the point where it can automatically re-adjust machines any time an over or undersize gear is produced. Originally designed to automatically grade and separate over and undersize gears, the new device is said to be so sensitive that it will correct machines for dimensional errors caused by tool wear and changes in temperature. If a certain percentage of over or undersize gears comes off within a given time, the device automatically shuts off the machine, signaling the line operator that tools need sharpening or that some other form of attention is needed.

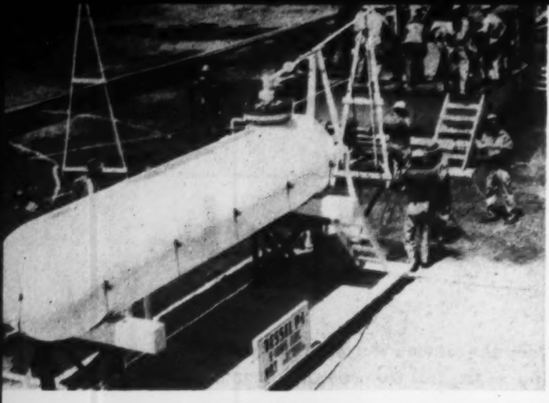
NONDESTRUCTIVE TESTING— If you're thinking of putting in a betatron industrial radiography lab, you'll be interested in a how-to bulletin on the subject being offered by Allis-Chalmers, Milwaukee. Information covers such things as location, construction, work handling equipment, heating and ventilating, location of electrical gear, etc. The company says it amortized the cost of its betatron lab in less than a year from savings resulting directly from its use.

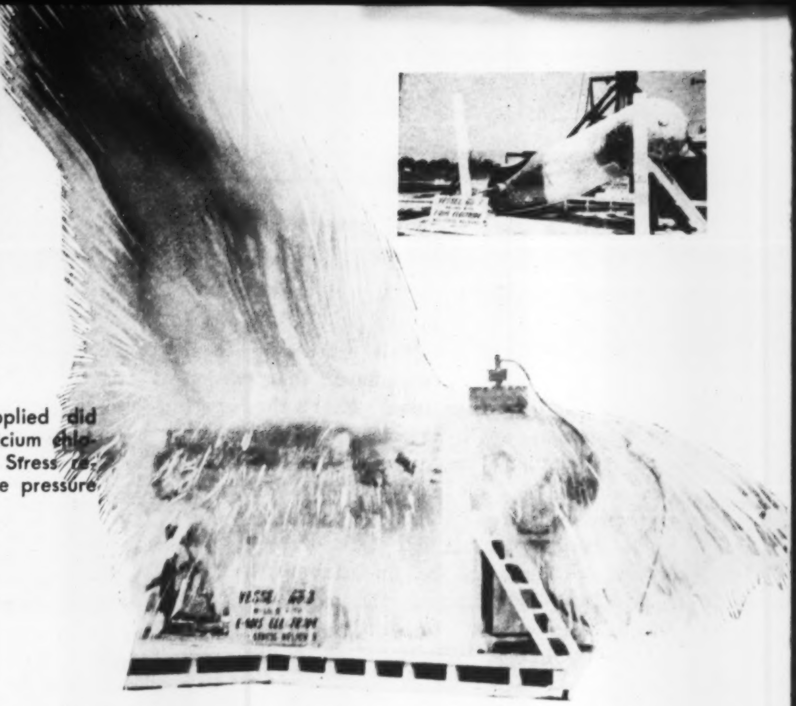
IN BUSINESS— Prediction that privately financed atomic power plants will compete dollar-wise with conventional types in 5 to 10 years is made by Francis K. McCune, atom official at General Electric. He thinks best bets are: 1. A water moderated and cooled boiling reactor; 2. A graphite moderated water cooled reactor.

ALLOYS— A copper alloy, containing tin and manganese, has been announced by the Tin Research Institute, Greenford, England. Within a certain range of compositions, properties can be improved by suitable heat treatment. Those that contain not less than 15 per cent manganese or less than 6 per cent tin are nearly white. Alloys are easily stamped or worked as sheet and can be plated with silver, speculum, tin-nickel or other finishes. With the shortage of nickel, nickel-silver users are interested in the alloy.

WIRE COATING— A new continuous hot dip process is being used by Page Steel & Wire Div., Monessen, Pa. Aluminum coated wire they turn out conforms to physical properties of ASTM spec A-122-52-T for galvanized strand. Resistance to weathering in industrial atmospheres is described as exceptional.

Metalworking Outlook—p. 43   Market Outlook—p. 151





Not until 2850-psi internal pressure was applied did the steel give way, and a geyser of −45°F calcium chloride brine gushed from hole in tank's side. Stress relieved and non-stress relieved tanks stood same pressure

New Steel *Passes* Toughness Test

Pressure tank rating is tops, but any use requiring a structural steel of high strength, great toughness and good weldability that can be gas-cut and cold-formed is in the picture

By DR. ALLEN G. GRAY
Technical Editor

SEEING IS believing. That's the technique U. S. Steel used to show off properties of Carilloy T-1, its new, super tough, quenched and tempered steel.

Four large T-1 pressure tanks, cooled to −45° F and coated with ice, were literally blown up in burst and impact tests on the grounds of Chicago Bridge & Iron Co., Birmingham, the last two days in June.

On hand to see the tests there were some 300 industry, military and technical-code authorities.

Object was to sell suitability of quenched and tempered steel for pressure vessel construction, but U. S. Steel experts did not rule out other applications. They were quick to point out that the pressure vessel is ideal to demonstrate strength and toughness because it gives pure tension.

Strength of T-1, sold at 90,000 psi minimum yield strength, is three fold that of mild-carbon steel. It costs about 2½ times more.

The low temperature toughness is good. Atmospheric corrosion resistance is two to three times better than carbon steel.

Two Ways—Two burst tests were made to see how much pressure the tanks could stand before exploding. A new drop test for full scale vessels was used—26,700-pound steel weight was dropped 52, 73 and 101 feet with tank under 1875-psi internal pressure and cooled way below zero.

The four tanks put through the routine looked the same. Made of ½-inch steel plate, they were 20 feet long and 48 inches in diameter.

For one test series, tanks were not stress relieved. They were in the natural condition as welded.

Tanks for the other tests were stress relieved (given a special heat treatment after fabrication). In burst tests, both stress relieved and nonstress relieved tanks failed at 2850-psi internal pressure. Point here: Need of modifying requirements for stress relieving where they pertain to toughness.

More Capacity—Real payoff of

T-1 STEEL

Carbon	0.15
Manganese	1.00
Phosphorus	0.014
Sulphur	0.022
Silicon	0.27
Nickel	0.94
Chromium	0.53
Molybdenum	0.45
Vanadium	0.05
Copper	0.34
Boron	0.0014

MINIMUM PROPERTIES IN SECTIONS UP TO 6 INCHES

Yield Strength, psi	90,000
Tensile Strength, psi	105,000
Elongation in 2 inches, per cent	16
Reduction of area, per cent	45

QUENCHING

Plates held at 1650° F for 1 hour, quenched cold in water.

TEMPERING

Plates held at 1175° F for 1 hour, quenched cold in water.

no stress relief will be in field-erected vessels. A sphere 65 feet in diameter could take on the gas storage job calling for 25 vessels built to maximum diameter now permitted.

In working out a recipe for the new steel, USS researchers put toughness first. The two most important metallurgical characteristics in the picture: Microstructure and carbon content. Structure is tempered martensite; carbon content is low—less than 0.20 per cent. First consideration was hardenability in relation to a microstructure with goal of at least 95 per cent martensite on water quenching.

Alloying elements used to get this hardenability are a sprinkling of manganese, nickel, chromium, molybdenum and boron in amounts less than 1 per cent (see box). Boron is potent at the low carbon level of T-1 and multiplies the effectiveness of the other alloying metals.

Tough Structure — Tempered martensite is tough by nature. It resists brittle behavior under adverse conditions. Strength level (with this low carbon content) is higher than possible with other microstructures.

Low carbon is also needed for good weldability. Welds that develop the full strength of the base metal can be made in T-1 without preheating or postheating.

High toughness of the steel minimizes chances of brittle behavior under adverse conditions, such as: 1. Stress concentrations at notches, sharp angles or abrupt changes in section; 2. rapid loading rates; or 3. low temperature service.

Brittle behavior of this type shows up as failure with no evidence of ductility. T-1 scientists used the Charpy (keyhole) impact tests in formulating a steel with resistance to this kind of behavior.

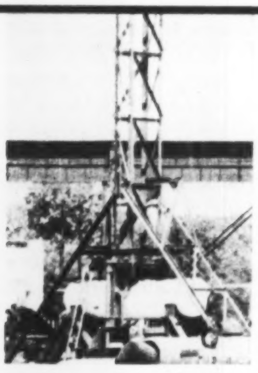
Some 5000 tons of T-1 plate have been turned out. Most of it has been used in power shovels. Here its toughness when abused at low temperature is outstanding.

A leading electrical manufacturer uses T-1 steel in generator components where high strength is needed for parts with contours that require considerable gas-cutting. Previous practice was to machine the parts from a high carbon, quenched and tempered steel.

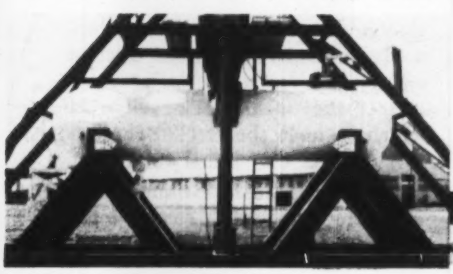
Future—Car wheels and towers for radio and television transmission are prospective uses. Tension members, such as rods in dam gates and other structures, are good applications. Plate for shipbuilding is another.

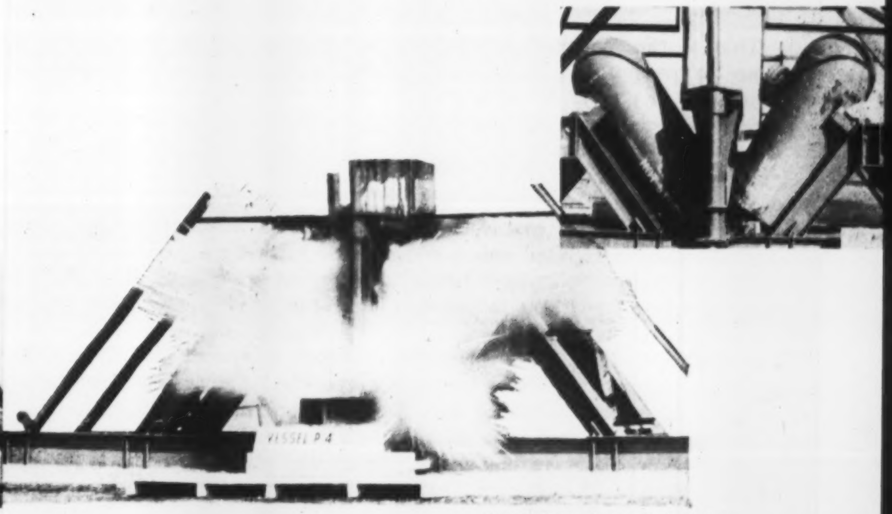
Experts working with the new steel say it may be possible that certain parts made from forgings can be fabricated to the desired contours by gas cutting.

Recap—If you are thinking of T-1 for your products keep in mind: Its will to resist abuse and toughness, especially at low temperature; less weight and inertia; lower freight and cheaper handling costs; possible elimination of stress relief annealing; and bigger pay loads in mobile equipment.



When 13-ton weight was dropped from 101 feet, cold T-1 tank, under 1875-psi pressure, gave way in test

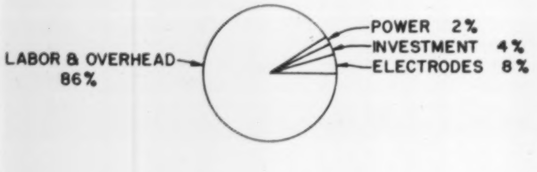




Chicago Bridge & Iron Works photos

HORIZONTAL FILLET WELD

	PLATE SIZE	FILLET SIZE	ELECTRODE SIZE	CURRENT	ARC SPEED "/ MIN.
IRON POWDER E-6020	3/8"	1/4"	3/16"	270 AC	15.0
	3/8"	1/4"	1/4"	350 AC	12.0
IRON POWDER E-6012	3/8"	5/16"	1/4"	360 AC	14.0
	3/8"	5/16"	5/16"	400 AC	10.0



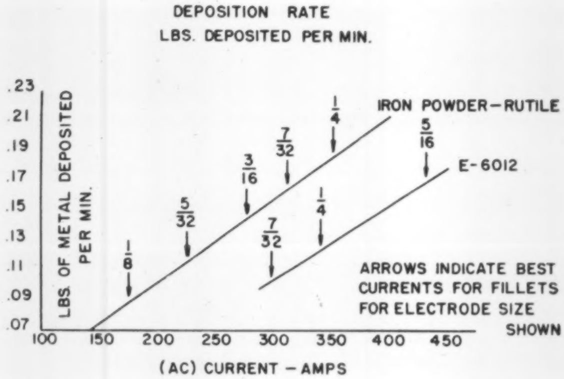


Fig. 1

IRON POWDER COATINGS

Electrode Design Matches Advance Billing

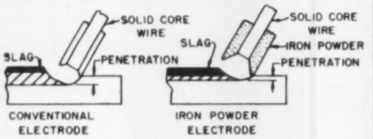
A year's application indicates the iron powder types mean lower welding cost through higher welding speed and reduced cleaning requirements

By JERRY HINKEL
Application Engineer
Lincoln Electric Co.
Cleveland

HEAVILY - COATED electrodes containing large quantities of powdered iron in their coatings are achieving increased welding speeds on the order of 50 per cent. Appearance in smoothness and freedom from spatter almost equal that obtained with automatic welding.

This is the evidence apparent almost a year after the powdered iron type has been available for broad U.S. commercial application. Actually, adding iron powder to an electrode is not new. Designers have toyed with the idea almost from the first days of coated electrodes. Some electrodes with iron powder in their coatings have been available from overseas sources for several years.

Composition—U.S. development of this electrode type has overcome major shortcomings of earlier efforts—high price and lack of some desirable operating properties. Present development indicates that any common electrode coating type will lend itself, with some modification, to addition of iron powder.



Crucible effect in electrode with iron powder coating means electric energy of the arc is used more efficiently

Most popular of the iron powder electrodes available now are those of the rutile type. Others are described as organic, or all position, and iron oxide or mineral type. The description, rutile plus iron powder, is oversimplification but appropriate, since the products have more in common with conventional rutile E-6012 and E-6013 than any other standard type.

Deposition Rate—Most important single advantage of iron powder electrodes is their high deposition rate. This is illustrated in Fig. 1. Also indicated is the fact that even if a smaller electrode is used, it still will deposit weld metal at a faster rate of speed. For example, a 5/32-inch iron powder electrode has higher deposition rate at 250 amp than does a 7/32-inch E-6012 electrode at 300 amp.

Size for size, iron powder electrodes are capable of depositing weld metal about 50 per cent faster than any conventional electrode.

Reason Why—Metal arc process in effect makes steel by the electric furnace method. An electrode serves as a source of electric energy and as a source of filler metal; there's also a crucible in which to melt the steel. The analogy holds for either electrode.

However, there are some points of difference. In conventional electrodes, crucible effect occurs

OPERATING CHARACTERISTICS OF RUTILE IRON POWDER ELECTRODES

1. Recommended Current—Generally somewhat higher than for conventional types. An experienced operator can usually decide quickly without ammeter when he has suitable current. Operators may have some difficulty obtaining recommended currents by machine dial setting alone because of higher arc voltage nature. Dial calibrations on most machines were not made with higher arc voltage in mind, so it's usually necessary to set current at a higher value than would be expected to get recommended current.
2. Resistance to Arc Blow—While iron powder electrodes are recommended for both ac and dc operation, ac is preferred. In dc welding, the rutile type exhibits excellent resistance to arc blow. Since nature of the slag is to follow the arc closely, preferential grounding condition which permits the operator to weld toward the ground rather than away from it usually produces best results.
3. Contact Electrode—Heavy iron powder coating makes electrodes ideal for use with contact or drag technique. For operators who prefer to hold an arc, there's no reason for not doing so, except that it's more fatiguing.
4. Restriking—Inherent disadvantage of not restriking quickly does not hold true with iron powder types. On the contrary, they restrike on touch. Thus, they are ideally suited for short or intermittent welds and this is true with ac or dc machines.
5. Weldability—Iron powder electrodes produce anything but a convex bead shape, yet are very good for welding crack-sensitive steels. This can be explained from standpoint of less admixture, less total heat input and higher strength weld metal. In many instances, E-6012 or even some low hydrogen electrodes have been replaced successfully on crack-sensitive applications with iron powder electrodes.

almost entirely in the base metal; in the iron powder type, crucible occurs for the most part up in the electrode itself. Therefore, the latter confines most of its electrical energy up in the coating, more effectively utilizes it to melt the electrode. Coating itself contributes to this effect because of its relative thickness. Because of these arc characteristics, iron powder electrodes do not offer deep penetration — sometimes an advantage, as in the case of poor fit-up. In other instances, it may be a disadvantage.

Other differences: Iron powder electrode has not only a core wire, but an appreciable percentage of iron powder in the coating. This melts more rapidly. With the iron powder type, higher arc voltage occurs naturally. Thus, if welding current is constant, total electrical power at the arc is considerably greater.

Bead, Spatter—In the case of fillet welds, type of joint for which these electrodes are best suited, bead shape is slightly concave to flat. No metal is wasted in the form of excessive convexity. In addition, spatter loss is nil at almost any conceivable current, and the bead is smooth.

Any size conventional fillet can be made at a correspondingly higher arc speed with iron powder electrodes. This higher speed amounts to a very significant user saving, since labor and overhead costs represent about 86 per cent of total welding cost.

Slag Removal — Self-removing slag feature can be obtained on most welds. This condition will occur providing sufficient quench effect is present and surface is smooth and free of undercut.

In a very tight V-joint it is unlikely that slag will remove itself. But because it is very dense, solid slag, its removal generally is accomplished cleanly and completely without much effort. This is important, because in many applications time-saving in slag and spatter removal will amount to as much as that saved through increased welding speeds.

Adapted in part from a paper presented at the AWS spring meeting and exposition at Buffalo, N. Y.

Physical Properties of Iron Powder Electrodes

As Welded:

Yield	65,000 to 75,000 psi
Tensile Strength	80,000 to 90,000 psi
Elongation in 2"	18 to 25 per cent

Stress Relieved:

Yield	65,000 to 75,000 psi
Tensile Strength	80,000 to 90,000 psi
Elongation in 2"	25 to 30 per cent

Impact Resistance (Charpy Keyhole Notch):

Room Temperature	28 ft lbs
–70°F	20 ft lbs

Transition Temperature Approximately –100°F

Recommended Currents

Electrode Size	Current	Polarity	Fillet Size	Arc Speed "/ Min.
5/32	225	AC	7/32"	15
5/32	200	DC+	7/32"	12.5
3/16	275	AC	1/4 "	15
3/16	250	DC+	1/4 "	12.5
1/4	350	AC	5/16"	14
1/4	300	DC+	5/16"	12

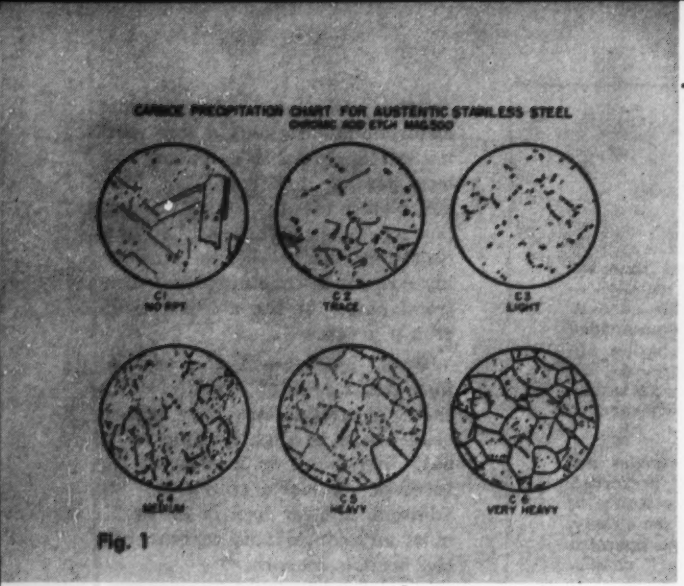

CARBIDE PRECIPITATION CHART FOR AUSTENTIC STAINLESS STEEL
CHROMIC ACID ETCH MAG.500
C1 NO PPT
C2 TRACE
C3 LIGHT
C4 MEDIUM
C5 HEAVY
C6 VERY HEAVY

Fig. 1

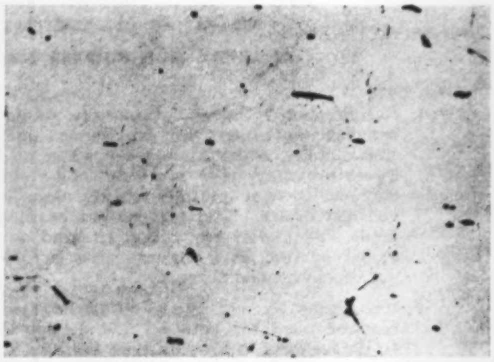


Fig. 2: This sample of 310 in the as-received condition shows little carbide network. Magnification: 340x

Carbides in 310 Stainless Steel —PART 1

Each carbon particle may fasten to chromium as much as 17 times its weight to form complex chromium carbides. Chromium adjacent to grain boundaries is depleted

By HIRAM BROWN
Company Chief Metallurgist
Solar Aircraft Co.
Des Moines, Iowa

TYPE 310 stainless steel, a desirable heat and corrosion resistant alloy, has good ductility and weldability, but its peculiarities must be recognized.

Mills report the material (25 per cent Cr, 20 per cent Ni) has a tendency to crack during hot working (but the addition of rare earths during the melting operations helps minimize the rolling problem); and difficulties are frequently encountered during shop fabrication of sheet or strip.

Sporadically, heats are received that crack during drawing or as louvers are punched. Such material may develop an etched surface during acid pickling. The difficulty usually can be traced to chromium carbide networks around grain boundaries.

Why—The solubility of carbon in 310 at room temperature is slight. For that reason—even in material having 0.08 C maximum—carbides precipitate at the slightest provocation. They are primarily carbides of chromium that form hard brittle constituents in the grain boundaries.

Each carbon particle may fasten to chromium as much as 17 times its weight to form Cr_4C or other complex chromium carbides. This depletes areas adjacent to the grain boundaries of the chromium necessary to make steel stainless, and makes grain boundary corrosion possible in some media.

How — This carbide condition can be produced during the rolling and processing of the material at the mill or by improper handling in the fabricating shop.

Because 310 is sluggish in reabsorbing carbides, higher solution heat treating temperature is necessary than for the 18 chromium-8 nickel grades of steel, and to keep the carbon in solution, a more rapid quench from heat treat temperature is necessary.

Where 1800 to 1950° F may be

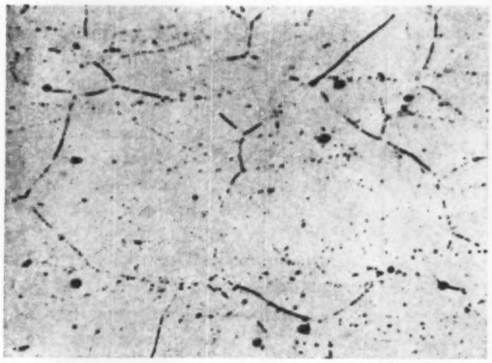


Fig. 3: Here is a medium carbide network in as-received 310. In all photomicrographs shown, oxalic etch was used

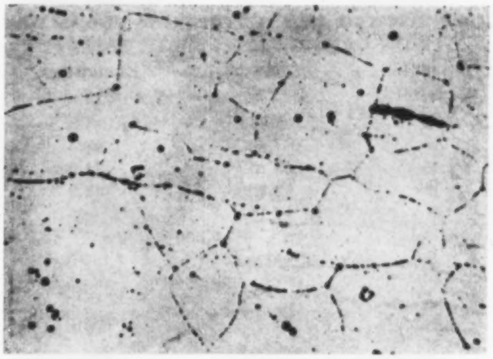


Fig. 4: This is an example of a heavy carbide network. Again, material pictured is 310 stainless as received

satisfactory for the solution heat treatment of the 18 Cr-8 Ni grades of stainless, at least 2050° F should be used for 310. Water quenching from this temperature is more effective than air cooling in retaining carbon in solution. So low heat treat temperature or slow cooling are the usual faulty practices that cause chromium carbide formation.

When severe chromium carbide formation occurs, the metal may have a leaden sound instead of a metallic ring. It is said to be sensitized, since it is likely to be sensitive to attack by corrosive media.

The Task—Since the culprit can be so easily named, it might appear that this is a simple problem, but actually it is complex. In examining samples under the microscope, we could distinguish between material having a "continuous" carbide network and that having a "discontinuous" carbide network. We also found we did not encounter cracking or etching during pickling of any heats having "discontinuous" carbide network; however, not all heats with "continuous" carbide networks gave trouble.

So we were unable to predict poor performance based solely on a bad carbide network rating. The investigation of why this was so proved to be complex and time consuming, and, probably, there are some factors we have not considered.

Terminology — Since it was found that difficulty could be encountered with material in which the carbides formed a "continuous" grain boundary network, while little trouble was encountered with material having "non-continuous" networks of carbides, the terms "continuous" and "discontinuous" became debatable. Since the carbides themselves appeared individually to be spheroid-shaped particles, the statement was made that we were encountering "continual" rather than "continuous" networks. To eliminate this sort of verbal problem, we adopted visual standards for evaluating carbides.

A carbide rating chart used for unstabilized 18 Cr-8 Ni grades of stainless was arbitrarily chosen for this purpose—copy of chart is shown in Fig. 1. Anything with a rating of C4 or better was acceptable; C5 was undesirable, and anything as bad as C6 was subject to rejection. (Hereafter, any carbide rating as bad as C5 will be referred to as continuous networks, and others will be referred to as discontinuous networks.)

Scope—A 100 per cent check on incoming heats of 310 was instigated to check carbide condition. Material was being purchased from six large, reputable mills. Under the microscope, vendors were divided into three groups: (1) Two mills that consistently furnished material with carbide rating of C1 or C2 as shown in Fig. 2. (2) Three mills that furnished material with ratings ranging from C3 to C6 as shown in Fig. 3, and (3) one mill which furnished almost every heat with rating of C5 or C6 as shown in Fig. 4.

It was also found that mills producing the material at more than one location could show wide differences in carbide ratings. It was also apparent that some sources used hand mills, while others used continuous mills, but carbide ratings obtained were independent of differences in rolling techniques—of the two mills that consistently produced material with carbide ratings of C1 or C2, one was a hand mill and the other a continuous type.

Reaction—When we began to sort out heats and reject shipments on carbide rating, many producers dissented. First, our etching technique was challenged—we electrolytically etch samples in a saturated solution of oxalic acid in water at room temperature, using 4 volts for 10 seconds—see Figs. 2, 3 and 4 for examples.

Other etchants were suggested, including glyceregia, chromic acid, sodium cyanide, Fry's reagent and

COMPARISON OF TENSILE PROPERTIES AND HARDNESS WITH CARBIDE RATING OF 310 SHEET(1)

Heat	Carbide Rating (2)	Tensile PSI	Elongation % in 2 Inch	Hardness Rockwell B
1	2	86,500	44.0	67.5
2	2	87,400	43.5	75.0
3	5	88,200	41.0	78.0
4	6	87,700	44.0	77.5
5	5	96,100	36.0	87.0
5A(3)	5	85,600	44.3	77.5
6	6	93,700	37.0	85.5
6A(3)	6	86,300	43.0	77.5

Notes: (1) Results represent average of 3 tests each; (2) Per chart shown in Figure 1; (3) After 10 minute anneal at 2000° F.

Marble's reagent. Most of those that reveal carbide networks do not delineate the grain boundaries until the carbides are overetched.

Glyceregia did bring out the grain boundaries well but did not attack the carbides preferentially. Marble's reagent delineated both carbides and grain boundaries. With the exception of glyceregia, it appeared that any of the listed reagents would enable proper evaluation of the carbide networks in 310. However, owing to reproducibility and stability of the oxalic acid etch, it was felt that it was quite satisfactory.

No Correlation — Some effort was made to correlate carbide ratings with physical test data from various heats—see table, but there was no correlation between normal tensile properties and carbide ratings. At first there appeared to be some definite relation in samples 5 and 6, but a 10-minute anneal at 2000°F restored ductility and softness without measurably changing carbide rating. Low ductility and high hardness were ascribed to residual stresses not completely removed after rolling.

Effort was also made to find some correlation between carbide rating and Ericksen cup test results; but none could be found. Two samples showed increased ductility after a 2000°F anneal without any change in carbide rating.

Another Test—Heats from each of the vendors were heat treated at 2050°F for 30 minutes to see if the carbides visible in the as-received material could be redissolved and retained in solution during water and air quenching. Material received from the two mills that consistently shipped material of C1 and C2 ratings showed practically no change in microstructure after 2050°F heat treatment with either quench.

Material from the mills shipping C3, C4, C5 and C6 ratings showed solution of carbides at 2050°F and retention in water quench but heavy carbide precipitation in air quench.

Material from the mill that shipped C5 and C6 material consistently was erratic. Some heats showed solution of carbides at 2050°F with good retention on water quench and fair retention on air quench. Other heats would not show carbide solution until 2150°F was used, and as long as 2 hours at that temperature was occasionally required.

No Help—To overcome this difficulty, the last mentioned mill made several heats with about 0.20 titanium added to stabilize the carbides. These heats had heavy chromium carbide networks and numerous titanium carbonitrides. It was extremely difficult to dissolve the carbides by heat treatment. Ordinarily, the addition of titanium will stabilize carbides. Instead of grain boundary networks of chromium carbides, randomly scattered titanium carbides will precipitate.

It is difficult to say why chromium carbides did form so heavily even with titanium present. Possibly the mill used high temperature to solution heat treat the material and had dissolved the titanium carbides. In cooling from this temperature, chromium carbides had formed rapidly.

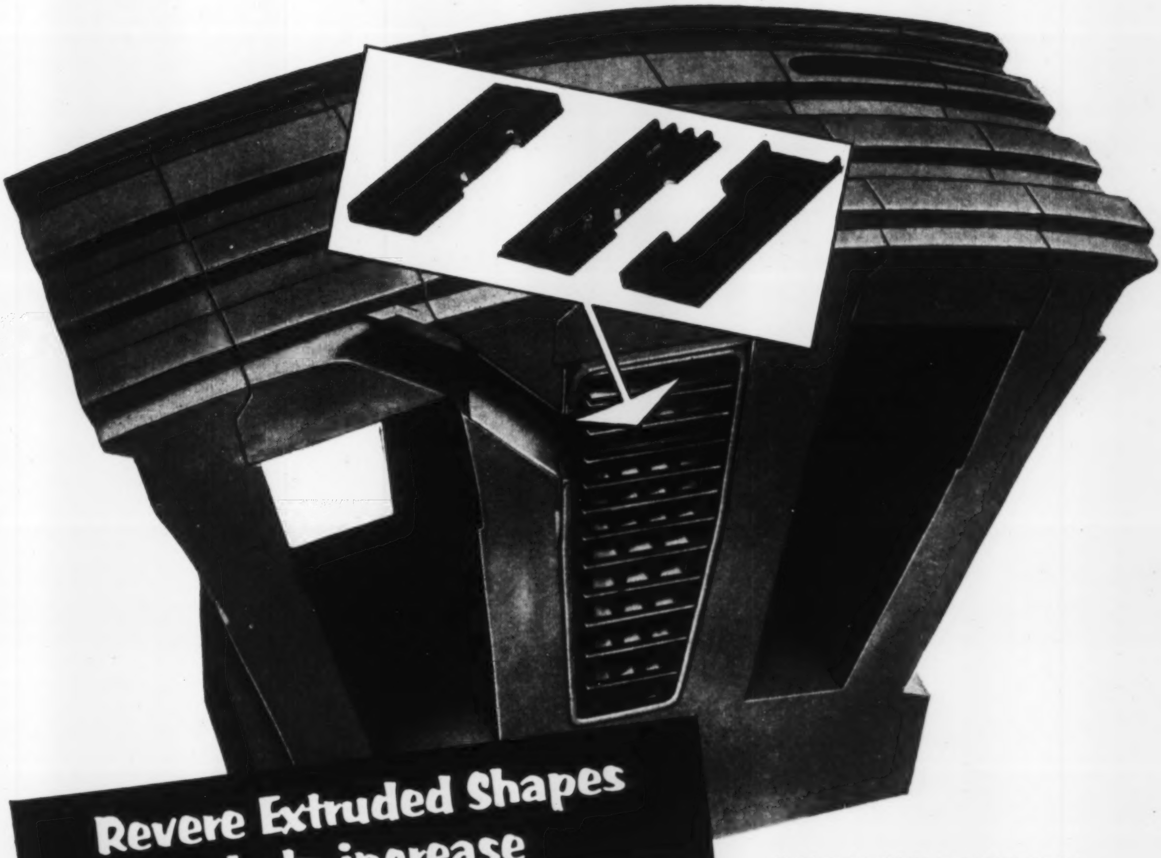
Effort also was made to correlate carbon with acid etch using the Huey test. But no consistent correlation between carbon content or carbide rating and corrosion rate was shown. However, the lower carbon samples had the best carbide ratings; higher carbon samples had the highest corrosion rate.

This is the first of two articles on the subject by Mr. Brown. The second article will appear in next week's issue of STEEL.

The author, who is company chief metallurgist and a member of the corporate staff at Solar Aircraft, has had wide experience in the ferrous and nonferrous fields.

Before joining Solar in 1946, he was plant manager for Aluminum Industries, Cincinnati. Other important posts were held by him at the Frontier Bronze Corp., Niagara Falls, N. Y., and the Aluminum Co. of America.

He is the author of a book, "Aluminum and Its Applications," published in 1948.



Revere Extruded Shapes help increase ELECTRIC GENERATOR OUTPUT

(perhaps you, too, could use our shapes to your advantage)

Model section of G.E. direct-cooled rotor for turbine-generator. Note intake scoop at left front, hollow copper conductors of extruded shapes, in center, exhaust outlet at right rear.

Insert shows typical extruded shapes after milling by G.E. to provide circulation of hydrogen throughout the field coils.

Winding temperatures are an important limitation upon the output of electric utility generators. They must be kept within safe limits to avoid damaging the insulation. Hence all generators have some method of cooling. Conventionally, the heat passes from the copper conductors in the rotor, through the insulation (which presents a formidable barrier to heat transfer) to the steel parts of the rotor body, and air or hydrogen is pumped through and around the rotor. It was realized long ago that more effective cooling could be obtained if some way could be found to remove the heat directly from the rotor coils.

Some years ago generator engineers of the General Electric Company, Schenectady, New York, proposed making each turn of the rotor coils of two copper extruded shapes; one a channel, the other comb-like. Fitted together, they would make hollow passages for the hydrogen, which would be taken in through scoops on the surface of the rotor, and exhausted through outlets some distance away, also on the rotor surface. In that way, the rotor could be quite uniformly and more effectively cooled throughout its length, and output greatly increased in relation to the physical dimensions of the generator.

An important problem was found in the extruded shapes. Design requirements had to be adjusted to the opportunities and practicalities of the extrusion process. Today these copper shapes, 20 feet long, drawn and finished to strict specifications as to dimensions and straightness, are making it possible to remove four times as much heat as conventional systems, and to double the generator output with no increase in size... For full information on extruded shapes, see the nearest Revere Sales Office.

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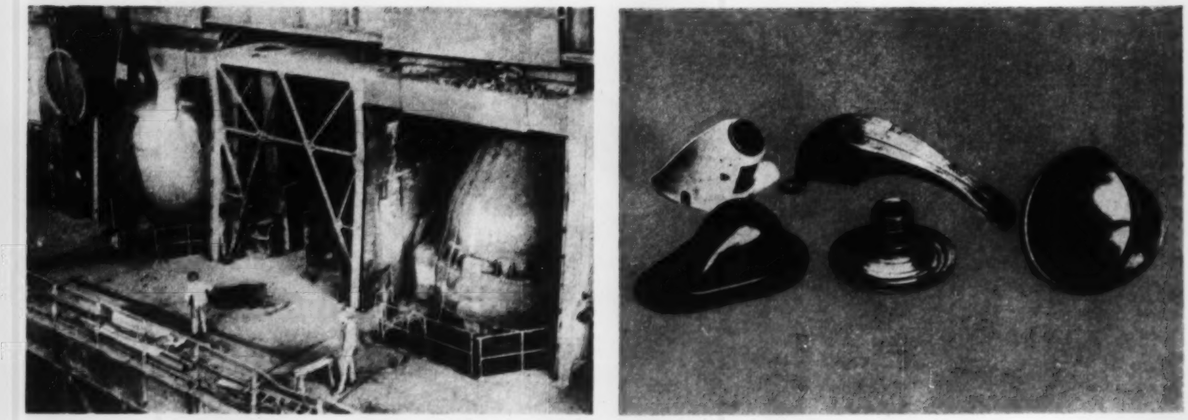
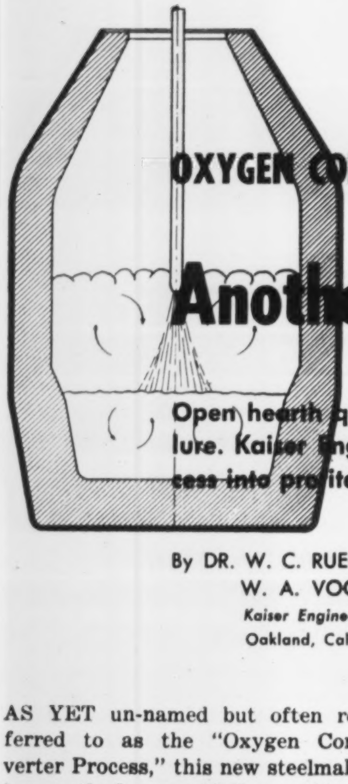


Looking not unlike a bessemer shop, the oxygen-steel plants of Austria have produced steel of high quality. Samples of cold drawn products testify to this



OXYGEN CONVERTER STEEL . . .

Another Step Closer To U.S. Debut

Open hearth quality at bessemer costs and tonnages is the lure. Kaiser Engineers have job of converting Austrian success into profitable American practice

By DR. W. C. RUECKEL and
W. A. VOGT
Kaiser Engineers
Oakland, Calif.

AS YET un-named but often referred to as the "Oxygen Converter Process," this new steelmaking method successfully combines the low investment and operating costs and high production tonnage potential of the bessemer with the high quality, high scrap charge, the accuracy of control of the open hearth process. The difficult problems involved in transferring this process from Europe to America have been undertaken by Kaiser Engineers in agreements with the Brassert Oxygen Technique of Zurich, Switzerland.

In this decade of the hundredth anniversary of the invention of the bessemer process, the oxygen converter presents itself as the third cyclical development with the promise of becoming the major complement to open-hearth furnaces wherever steel mills are found.

Closer Look — To explain the process, it will be desirable to consider a typical blowing cycle of a heat. The vessel is charged with 38.0 tons of metallics, consisting of 29.0 tons of pig iron, 8.3 tons of scrap, 0.7 ton of roll scale, to which is added 1.9 tons of lime. Into this is blown 2.4 tons of 95-per-cent-pure oxygen and with the lining contributing 0.3 ton, the total process materials will consist of 42.6 tons.

Oxygen is introduced by means of a water-cooled lance inserted vertically through the throat of the vessel. The jet of oxygen impinging

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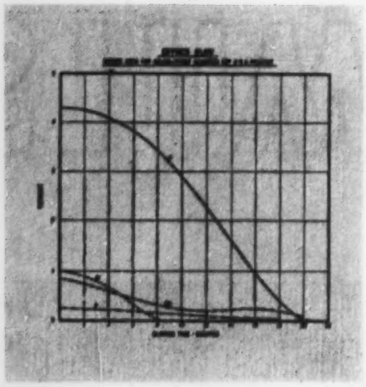
MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



on the surface of the bath initiates reactions within the molten metal to oxidize the metalloids. The rates of oxidation of the metalloids are not constant, and the duration of the blow, the rate of oxygen input, plus other factors, will affect the analysis of the refined steel.

Results—In a 20-minute blow the results can be expected in this order:

	Per cent
Carbon	0.04
Manganese	0.05
Silicon	0.02
Phosphorus	0.015
Sulphur	0.025

A total of 166.2 lbs, or 1960 cu ft of oxygen is required to bring about the oxidation of:

	Lbs of O_2
C to CO	101.0
C to CO_2	22.5
Mn to MnO	4.1
Si to SiO_2	22.9
P to P_2O_5	5.5
Dust	10.2
Total	166.2

At the completion of the blow, the lance is withdrawn and the vessel is turned down, pouring 35.0 tons of steel into the ladle.

Heat Balance—Table I shows the comparative heat balances between a conventional open hearth and the oxygen process. The oxygen process derives all of its heat required from the oxidation of the metalloids. For comparison purposes between the two processes, the same hot metal to scrap ratio (2000:570) is used, although it must be remembered that the furnace burden thus developed is purely hypothetical, since operating and metallurgical practice makes such a charge economically inadvisable.

If the process efficiency is considered as the sensible heat in the steel as related to the total heat involved in the process the efficiency of an oxygen converter would be 53.2 per cent and an open hearth 22.4 per cent. For the latter process an external source of heat is required. It can be seen from the table that a primary source of heat loss is in the heat of reduction of the ore in the open-hearth process. The elimination of this loss is but one of the features of the oxygen converter process.

The previous calculations have been predicated on the following hot metal analysis:

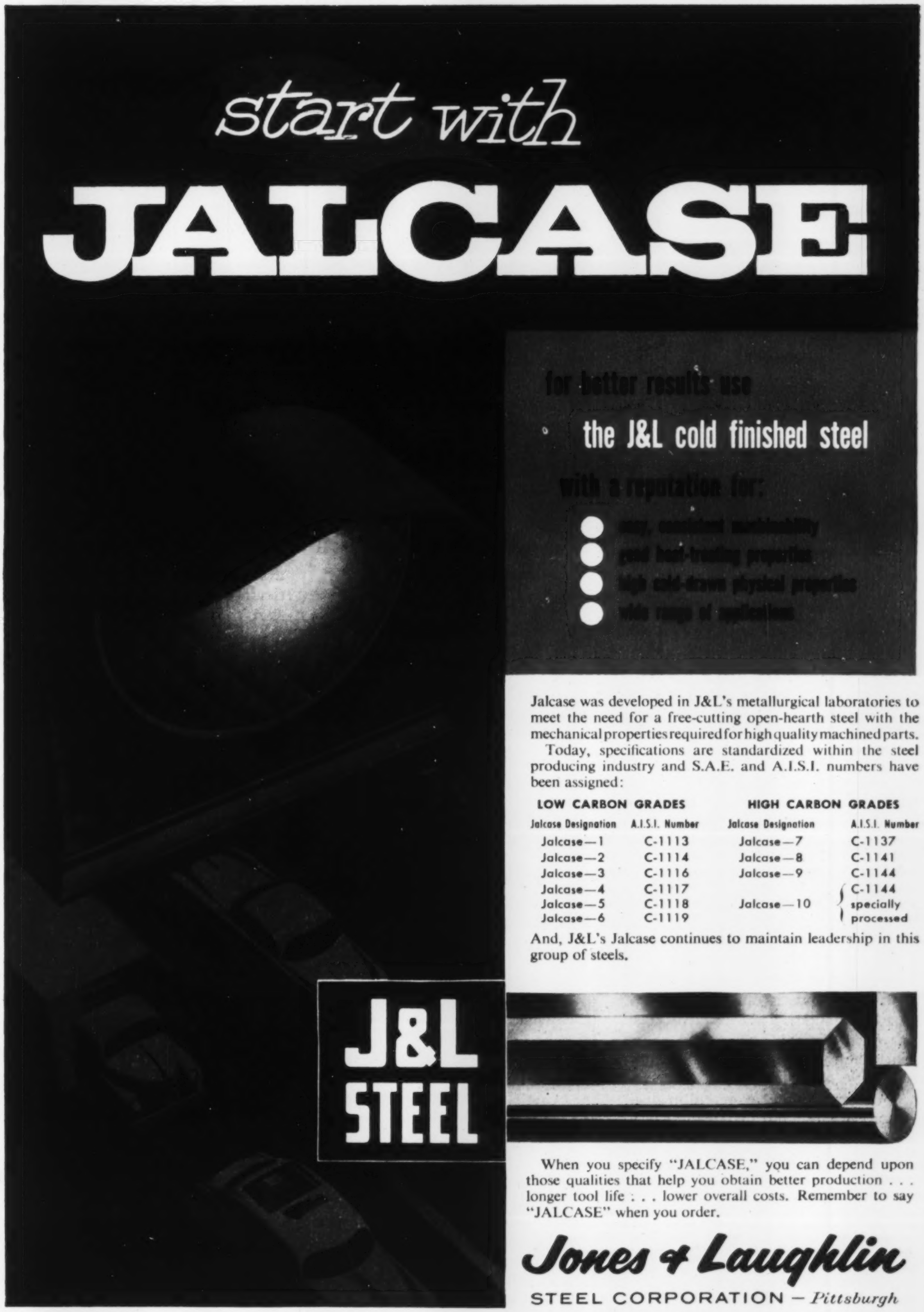
	Per cent
Carbon	4.25
Manganese	0.85
Silicon	1.00
Phosphorus	0.25

Oxygen Requirements — High-pressure oxygen is fed through the lance. Since the generation of the oxygen proceeds at a uniform rate, storage facilities should be provided to permit nonuniform consumption and to provide for temporary downtime of either the oxygen plant or converters. Local conditions and costs will generally determine the storage pressure of the oxygen. In a shop designed for continuous blowing (a 3-vessel

HEAT BALANCE PER TON OF STEEL

	Oxygen Btu (1000's)	Open Hearth Btu (1,000's)
1. **Heat Input and Exothermic Reactions**		
Heat of oxidation (Complete Combustion)	1348	1181
Heat in slag formation	56	83
Sensible heat in pig iron	911	809
External heat (Fuel)	—	3200
Total	2315	5273
2. **Heat Output and Endothermic Reactions**		
Sensible heat in steel (Converted pig iron and ore)	940	927
Sensible heat in melted scrap	292	255
Sensible heat in slag	185	265
Sensible heat in dust	18	8
Sensible heat in CO and CO_2 } Gas	138	285
Sensible heat in N_2 } Gas	—	690
Sensible heat in water vapor } Gas	—	406
Heat in reduction of ore	—	601
Heat in calcination of limestone	7	178
Heat to cooling water	9	300
Radiation and unaccounted for	100	1358
Heating value of waste gas	626	—
Total	2315	5273
3. **Burden**		
Hot metal	1650	1465
Scrap	475	438
Burnt lime	100	—
Limestone	—	230*
Roll scale	40	60
Ore	—	380

* 130 lbs burnt lime equivalent



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with a reputation for:

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- ● wide range of applications

Jalcase was developed in J&L's metallurgical laboratories to meet the need for a free-cutting open-hearth steel with the mechanical properties required for high quality machined parts.

Today, specifications are standardized within the steel producing industry and S.A.E. and A.I.S.I. numbers have been assigned:

LOW CARBON GRADES		HIGH CARBON GRADES	
Jalcase Designation	A.I.S.I. Number	Jalcase Designation	A.I.S.I. Number
Jalcase—1	C-1113	Jalcase—7	C-1137
Jalcase—2	C-1114	Jalcase—8	C-1141
Jalcase—3	C-1116	Jalcase—9	C-1144
Jalcase—4	C-1117	Jalcase—10	C-1144 specially processed
Jalcase—5	C-1118		
Jalcase—6	C-1119		

And, J&L's Jalcase continues to maintain leadership in this group of steels.

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When you specify "JALCASE," you can depend upon those qualities that help you obtain better production . . . longer tool life . . . lower overall costs. Remember to say "JALCASE" when you order.

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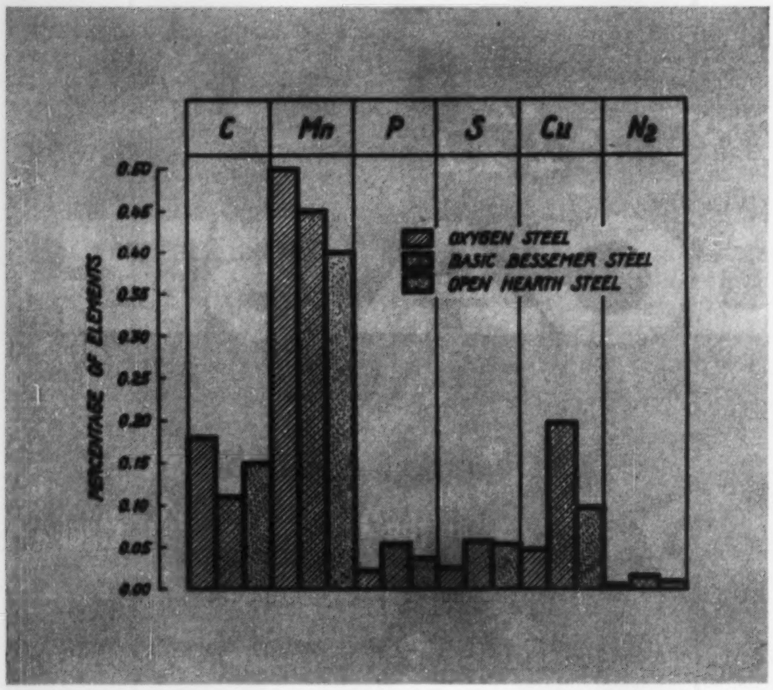
STEEL CORPORATION — *Pittsburgh*



shop with one converter blowing, one vessel charging, and one standby), the daily oxygen requirements will be about 200 tons per day, allowing 5 to 10 per cent for miscellaneous plant usages.

Cuscoleca, Trenkler, Suess and others consistently report the high quality of oxygen-converted steel which is comparable with basic open-hearth steel due to the small quantities of dissolved gases, particularly nitrogen. Because of this low gas content, the steel shows superior deformability and weldability.

Favorable Comparison — Comparisons between open-hearth and oxygen converted steels have been made in the laboratory and shop, with the result that in almost every case the oxygen-converted steel is shown to be equal in metallurgical properties to that of open-hearth steel. This is demonstrated by product mix of an existing oxygen-converter shop in Austria:

	Per cent
Tin strip	26.0
Autobody sheets, cold rolled	11.0
Deep drawing sheets, hot and cold rolled	19.0
Galvanized sheet	6.0
Plate	10.5
Bar and merchant mill products	26.0
Commercial qualities	1.5
	100.0

It can be seen that about two-thirds of the production from this shop is specifically of the type generally associated with normal open-hearth practice.

Dust and Fumes — During the "blow" large quantities of dust and fumes are emitted from the converter which would create a serious problem in air pollution if allowed to escape to the atmosphere. Dust is evolved at the rate of more than 30 pounds per ton of pig iron with a density comparable to that of cement and with 65 per cent of the particles being smaller than one micron.

Two possibilities of dust cleaning systems exist, both of which meet all existing air pollution codes throughout the country. The first is an open system wherein the gas is allowed to burn with infiltrated air and the resultant gas volume cooled and cleaned. The second system is a closed circuit wherein no infiltration of air is permitted. This system offers the obvious advantages of reduced size and gas volume together with the fact that a combustible gas is recovered.

Favor Closed System — With the converter evolving gas (partially burned) at a temperature of 3000°F a closed system becomes desirable for effective treatment prior to reclaiming the solids and gases. After flowing through a series of cooling towers, multiclones and filtration equipment, the extracted particulate can be briquetted or otherwise disposed of while the cleaned gas would continue to storage in a gas holder. The stored gas would contain 80 to 90 per cent CO, with a heating value of 250 to 290 Btu's per standard cu ft. The gas would contain no more than 0.015 grain of particulate per cu ft.

Precautions against explosions and hygiene hazards have been incorporated as an integral part of the gas cleaning system. No particulate will be deposited that will lead to pyrophoric action in any place in or adjacent to the gas cleaning system.

Economic Edge — The tonnage output of a single oxygen vessel is approximately 52 tons per hour. When compared with a single modern open-hearth furnace, this high tonnage advantage becomes apparent in the ratio of approximately 3 to 1.

Recent construction cost estimates for a typical new 2-converter shop place the capital investment at about $6,330,000. Of this sum, buildings and equipment would require $3,429,000, the oxygen plant $1,911,000 and fume control $990,000. On this basis, open-hearth quality steel can be produced at a cost of $14.50 per annual ton. A comparable new 500,000-ton open-hearth plant would run about $17, 500,000.

While the oxygen converter presents a compelling picture to the steel industry today, it will quite probably be some time before the full impact of its economy is felt by the steel industry. It is in a position to assume a major role, although it cannot at this time be considered as supplanting entirely either the open hearth, the bessemer or other steelmaking methods.

Operators in loading zone are shown placing workpieces on the hangers of the monorail system in preparation for the mechanized coating trip

ENGINEERING METAL FINISH

Methods, Materials Command Equal Stature

This finisher adopted a new primer, mechanized its system to achieve a readily-available all-weather coating. Economies include the same output in one less work shift

By ROBERT J. DEISENROTH
Methods & Process Engineer
Troy Sunshade Co.
Troy, O.

ALL-WEATHER finish is essential for metal furniture. We never know when our line of porch and lawn furniture will be used indoors or outdoors, whether in a hot, dry climate or under high humidity, salt air conditions of coastal areas.

As a result, we determined the only practical approach was to apply an organic finish capable of resisting all weather conditions.

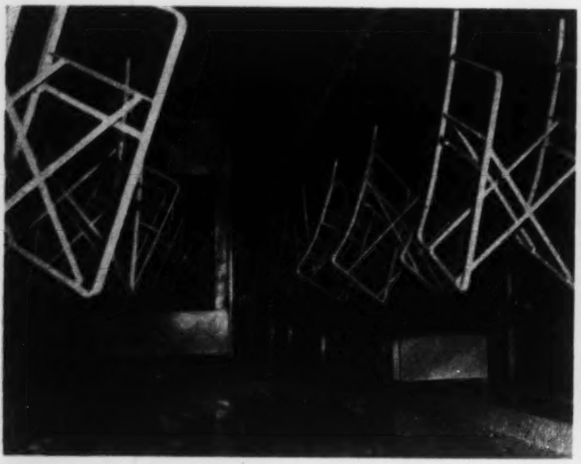
We had stopped chrome plating most of our line because of the nickel shortage and were attempting to reach a basis in which we were assured of maximum economy through new processing methods, and quality and durability through materials selection.

Methods, Materials—In selection of processing methods, this led us to rotary arm application of the primer and electrostatic spraying of the finish coat, with a continuous conveyor system replacing the dip setups and hand spray shops. Now, all painting operations are handled on a 2000-foot-long conveyor system, a system of finishing that handles the output of a plant of about 450,000 sq ft.

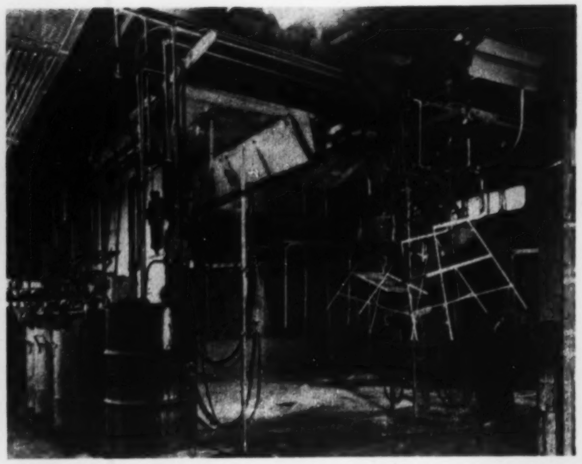
Fully as important as methods of application were properties of the paint itself. A primer coat with durability and resistance was essential. Shell Chemical Corp.'s Epon resin appeared to offer excellent resistance to wear and attack from salt spray and humidity. We finally selected a formulation incorporating this resin, supplied by Glidden Co. This primer, in conjunction with the finish enamel, showed superior resistance to necessary broad range of conditions in comparative tests. In addition, its adhesion was good. Because of the primer's performance, it was unnecessary to upgrade finish coat specifications to give the products a competitive appearance.

In practice, materials selected exceeded specifications in most provisions.

Finishing Cycle—At the start of our finishing cycle, various metal furniture parts are loaded onto the conveyor, an overhead monorail system with trolley wheels set on 24-inch centers, hangers on 8-inch



Above is interior of flow coater drain enclosure. Silhouetted entrance to the pre-dry section is at left



Prime coated ware is conveyed into Ransburg electrostatic spray booth for application of the finish spray

centers. Conveyor is chain-driven through variable speed motors at about 10 fpm.

The loaded conveyor first enters a five-stage metal cleaning cabinet. There work receives a spray of alkali cleaner, supplemented by an emulsion cleaner, at a temperature of 160°F. This is followed immediately by a hot water rinse in a constant overflow tank at 145° F. A Parker Rust-proof Spra Bonderite 100 solution is then sprayed over the work at 135°F, followed by a cold-water rinse. Final stage calls for a chromic-phosphoric acid spray at 130°F and a concentration of 4 ounces of acid per 100 gallons of water.

Enroute from metal cleaning unit to dry-off oven, excess water or solution entrapped in corners of the metal parts is passed off through effectively-located drain holes. After a 4-minute period in the dry oven, parts enter the Spra-Con rotary flow coater.

Primer Application—Flow coater has three rotating arms, one mounted on each side wall and one located in a horizontal position at the bottom of the coating zone. Each carries two nozzles from which the Epon primer is sprayed at 10 to 15 psi.

We chose this type of equipment for applying the Epon prime coat because we have such a wide variety of workpieces going through, most of them of an open or perforated type.

From the coating zone parts enter an enclosed drain zone under controlled solvent vapor concentration. Here, about 98 per cent of excess primer drains off and flows back into the feeding tank. Collected paint is filtered before being returned to the coating zone. Parts remain in the flow coater drain zone for about 15 minutes, are predried for 3 minutes at 150°F just before leaving the unit.

Air-Dry Enroute—The 10 minutes it takes for parts to travel from flow coater to direct gas-fired convection ovens on the roof serve as an ideal setup or air-dry period. Primer is baked for about 20 minutes at 300°F and dry film thickness of 0.3 to 0.5 mils is obtained. This is minimum thickness at which we achieve best results.

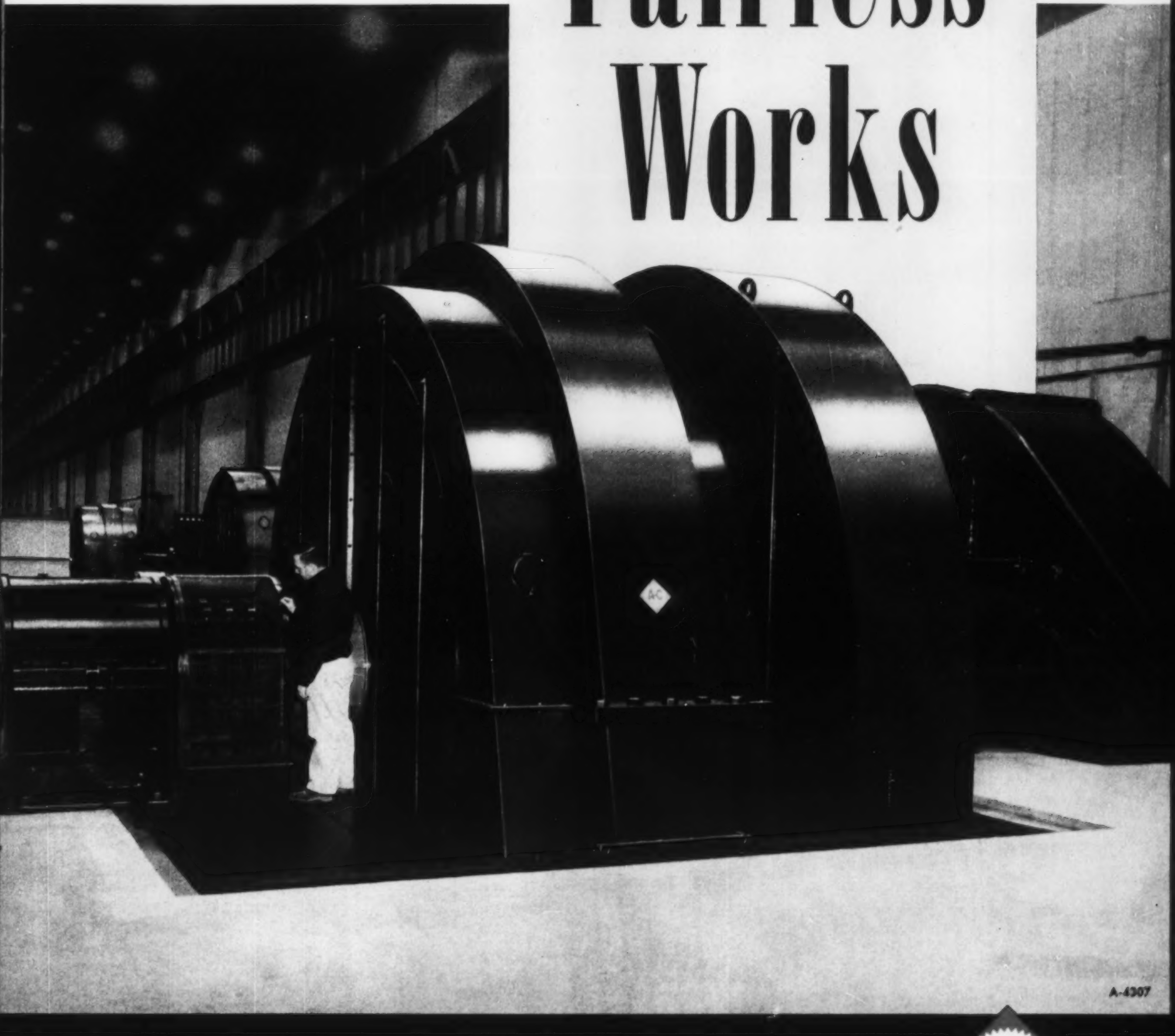
(*Please turn to page* 121)

Following tests on cold rolled steel and zinc coated steel, prepared with Parker Rust-Proof Co. Spra Bonderite 100, led to specification of this system:

1. Specular gloss—80, using 60- degree specular gloss as determined by Photovolt meter.
2. Pencil Hardness—F-H, 45-degree gouge with Eberhard-Faber grade pencils.
3. Adhesion—No shattering or flaking of film when scraped with knife blade edge across each of two different sets of cross-hatched lattice or parallel knife point "scribed-to-metal" lines, scribed so as to form 1/16-inch and ⅛-inch squares.
4. Mar Resistance—Very good resistance to fingernail.
5. Salt Spray—200 hours, with creep from scribe not exceeding 1/16 inch. No other rusting or blistering. Tests by ASTM Method B-117-44T, 20 per cent sodium chloride solution fog, 100° F.
6. Bend Resistance—No cracking, using Zuhr conical mandrel, 180-degree bend, ¼ inch diameter.
7. Humidity—500 hours, no lifting or blistering of film, 100 per cent relative humdiity, 100° F, panels at 45-degree angle.
8. Water Immersion—100 hours, no blistering or film impairment in aerated water at 100° F.
9. Weatherometer—300 hours, without exceeding slight chalking or loss of gloss using National Weather Machine with water spray.

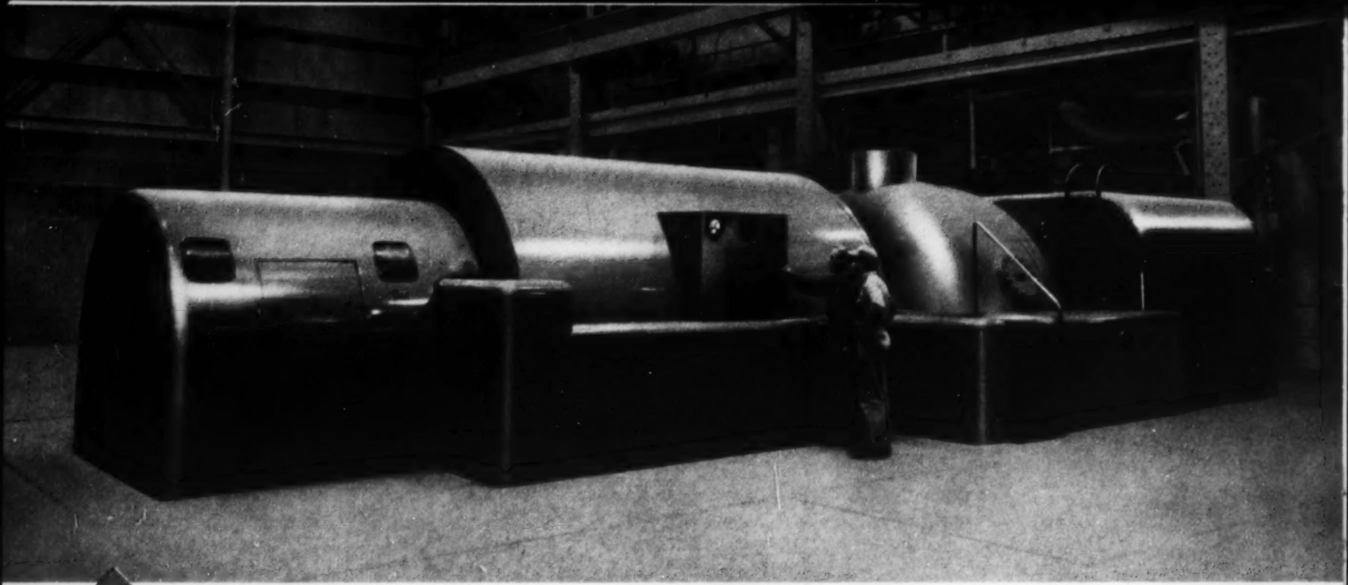
Allis-Chalmers Equipment for Steel Mill Duty at...

Fairless Works



ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN



33,000 kw of steam-electric power for Fairless. Turbine features include accessibility of stop and inlet valves, centralized operating controls, self-contained and automatic steam-sealed gland system, above-the-floor oil piping and effective control of horizontal and vertical thermal movements. The generator offers simplified hydrogen seals and control, spiral stator ventilation, flexible core mounting, and "walk-in" exciter housing.

Double-armature twin drives power this two-stand tin temper mill. Driving the No. 1 stand at left are four 150-hp dc armatures. Four 200-hp armatures comprise the No. 2 stand drive at right.

Another Allis-Chalmers first . . . voltage, current and tension regulation of the two-stand tin temper mill is provided by magnetic amplifiers which offer the most modern refinements to the control circuits.

ALLIS-

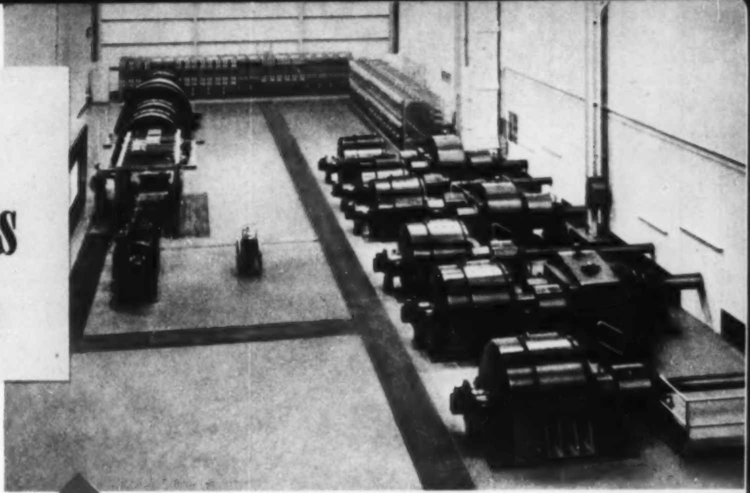
Serving Fairless Works

U.S. Steel Corporation's new integrated steel plant in the Delaware Valley, engineered for modern mill operations . . . produces its own coke, iron and steel as well as finished steel . . . is one of the largest plants of its kind in the world.

Again, as in other important mills of this vital industry, Allis-Chalmers was called upon to furnish a wide variety of equipment designed for steel mill duty.

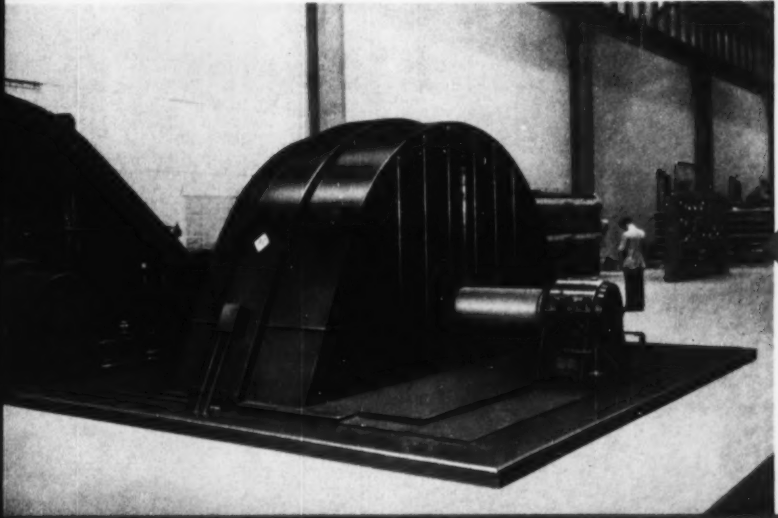
Rolling steel requires tremendous power, a part of which is produced by an Allis-Chalmers 33,000-kw turbine generator unit. *All* 250-volt direct current for material handling . . . from ore to finished steel . . . is supplied by A-C rectifier units totaling 25,000 kw and located throughout the plant for maximum efficiency. Important rolling operations for billet mills, hot strip mill, and the two-stand tin temper mill are accomplished with controls, motors and generators designed and built by Allis-Chalmers.

For specific information on controls, drives and other electrical equipment to meet the needs of your expansion or conversion program, contact the nearby A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin.



Allis-Chalmers controls, motor-generator sets, and drive motors for the 30-in. billet mill. Left background shows the 8000-kw m-g unit powered by an 11,200-hp synchronous motor, variable voltage control panel, and a 3-unit 180-kw exciter m-g set. The six drive motors are rated 1750 hp, 300/600 rpm, 600 volts dc.

Four 1250-hp, 400/800-rpm, 600-volt dc motors driving four stands in the 21-in. continuous billet mill. Variable voltage controls, 4000-kw synchronous m-g set, and a 130-kw exciter m-g set for this mill were also furnished by Allis-Chalmers.

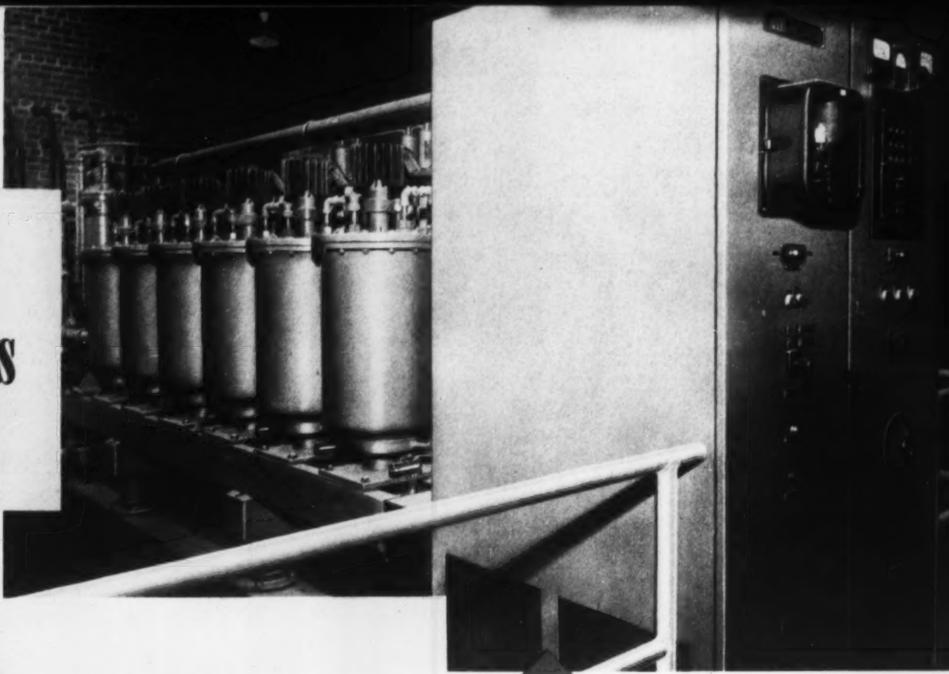


One of four universal roughing stand drives in the 80-inch hot strip mill. Operating in conjunction with the 3500-hp broadside wound rotor motor shown on the cover, these four 6000-hp synchronous motors provide power for reducing large slabs. Other A-C motors in this mill include a 2000-hp synchronous scale breaking motor and two 500-hp wound rotor motors for a vertical edger.

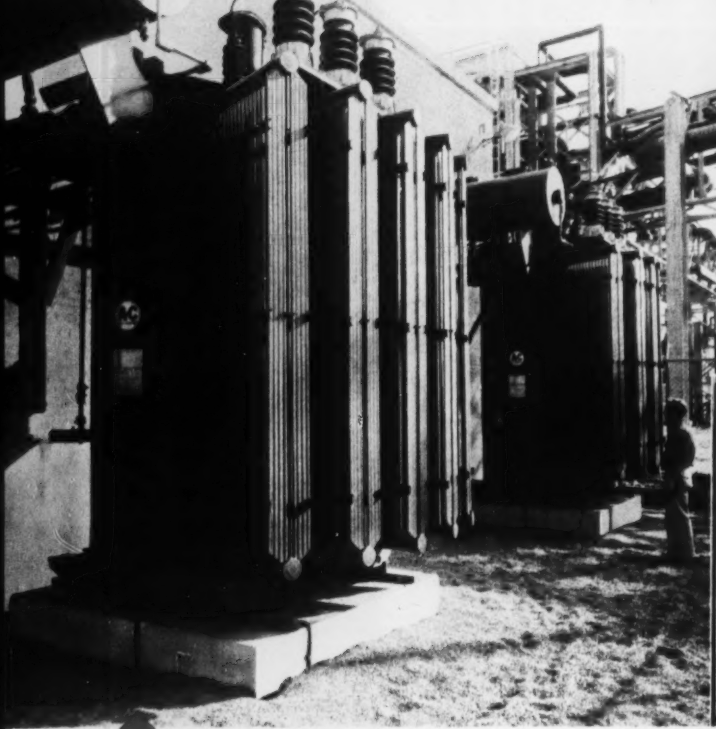
CHALMERS

A-C
ALLIS-CHALMERS

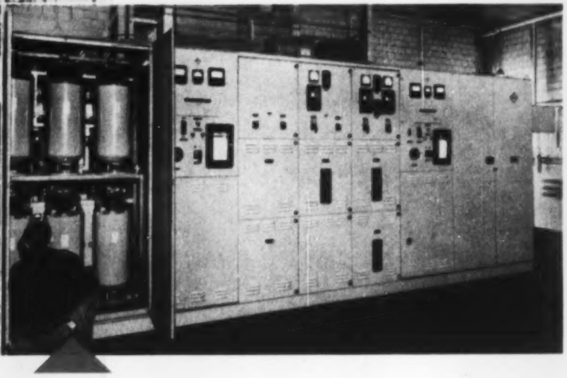
Serving Fairless Works



One of two 1500-kw, 250-volt rectifiers supplying direct current to cranes, pig casting machines, bailer, slag cars, and stock house equipment in Open Hearth Furnace area. Each unit substation is designed for a three-phase, 13,800-volt, 60-cycle supply and is suitable for starting and stopping by manual or remote control.



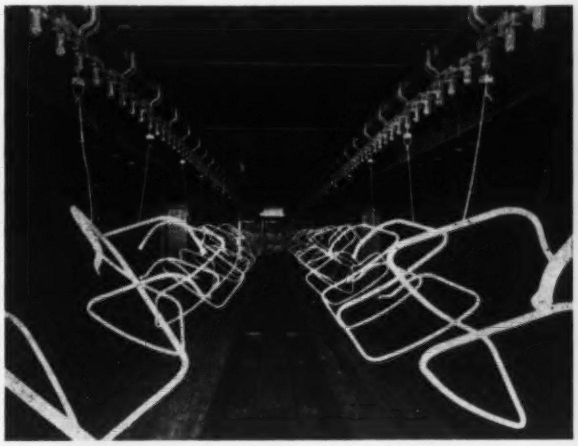
Outdoor type main transformers for two 1500-kw, 250-volt rectifier units in the Open Hearth area. These transformers are oil insulated self-cooled, with built-in interphase reactors, and are provided with ground level tap changers for ease of operation, and broad flanged wheels for use on rails or flat surfaces.



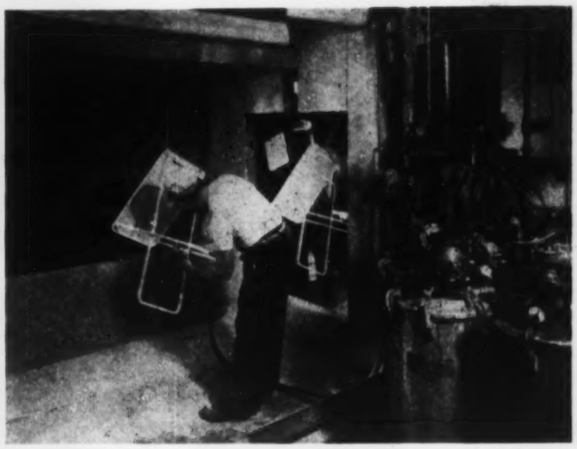
Two 500-kw, 250-volt metal-clad rectifier units supplying dc service to coke plant pusher and coke handling equipment in the Coke Oven area. Units are factory assembled and wired, complete with dc switchgear and transformers. Both rectifier units feed a common load, providing maximum availability at all times.

ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN



Above is shown interior view of the finish coat U-type oven which provides a 20-minute bake at about 300° F



Despite almost complete mechanization, some touch-up is still required in booth following electrostatic spray

(Continued from page 116)

The Epon primer provides superior performance at about one-third the thickness of primers we used previously. We get best results from this Epon-urea-alkyd system at a viscosity of 21 seconds at 80°F. Paint is kept at 80°F throughout the year by running it through a paint heater during cold weather, through a cooler during hot weather.

Electrostatic Spraying — Parts leaving the prime coat oven get a 10-minute cooling period as they travel to the Ransburg No. 1 electrostatic spray booth. Workpieces enter this double unit on one side, make a U-turn at the far end and pass through a high-voltage field where ionized particles of the finish coat enamel are deposited on the parts.

At present, we are using eight fixed-spray guns, four on each side of paint booth's exit end. One advantage of this arrangement: If production is increased, we can spray products both as they enter and as they leave the setup. Enamel used in the electrostatic booth has a viscosity of 17 seconds at 76°F. Atomizing pressure is 10 to 15 psi and fluid pressure from 2 to 5 psi.

Finishing Touch — Despite this degree of mechanization, it is still necessary to employ hand touch up, particularly on shielded areas of parts or assemblies. When this is necessary we keep the paint at 165°F.

Upon leaving the spray booth, workpieces have an adequate flash-dry period in the 10-minute travel to the finish bake oven. Finish coat enamel is baked for 20 minutes at 300°F in a direct gas-fired convection oven. Total dry-film thickness is from 1.5 to 2.0 mils.

It Gets Results—Under this new system, we have achieved considerable savings in both labor and material and have a much better finish. Now, the single conveyor can be handled by 10 operators—two loaders, two spray men, two touch-up men and four helpers. We require only two shifts to turn out the same amount of work we previously accounted for on three.

Although we do not have comparative figures on materials savings, we know that we are saving more than one dollar per gallon on reduced material used in the electrostatic unit. Present average is about 250 pieces an hour, with consumption of about 4 to 5 gallons of paint. Reject and rework rate, because of improved methods and materials, is less than 1 per cent.

Glidden Nu-Pon Primer, No. 62926

Type—Epon-urea-alkyd

Viscosity—85 seconds, Ford #4 Cup at 80° F

Reduced Viscosity—19-21 seconds at 80° F, Zahn #2 Cup

Application—Spra-Con Rotary Arm Automatic Paint Applicator

Bake—20 minutes at 300° F

Dry Film Thickness—0.3-0.5 mils

Glidden Nubelite White Enamel, No. 62131

Type—Alkyd-amino resin

Viscosity—50 seconds, Ford #4 Cup at 80° F

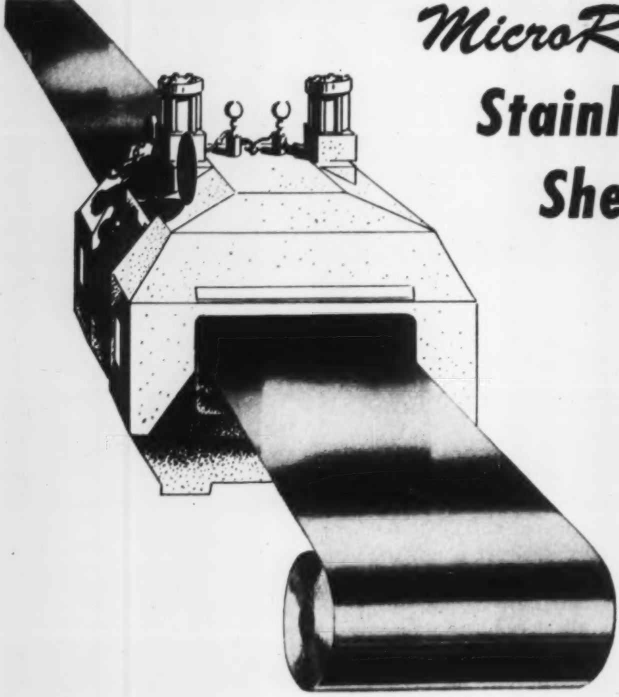
Reduced Viscosity—15-16 seconds, Zahn #2 Cup at 80° F
(For Ransburg No. 1 Electrostatic Unit)
27-28 seconds, Zahn #2 Cup at 80° F
(for manual spray)

Reduction—5:1 with Xylol for manual spray
(hot spray, 105 to 125° F)
1:1 with Naphtha for electrostatic spray

Application—Electrostatic and manual spray

Bake—20 minutes at 300° F

Dry film thickness—1.3 to 1.5 mils



regular use of...
MicroRold®
Stainless Sheets

SAVES MONEY!

Stainless sheets are usually ordered by gauge number—with permissible A.I.S.I. thickness variation of plus or minus 10%—but are sold on a weight basis. Thus, you may order 18 gauge, needing about .0475″ thickness, and receive .052″ thickness. But Micro Rold may be held to a 3% plus or minus tolerance; and you may order by gauge number, specifying that it be rolled on the "light side" of the gauge range. While these savings may not be apparent in every single sheet of MicroRold, the weights will average less than the theoretical when figured over a period of time. These savings can be substantial in your annual profit picture.

Washington Steel Corporation
WASHINGTON, PENNSYLVANIA
Washington Steel Corporation
Micro Rold
Sheet & Strip

Automatic Spray Booth

AUTOMATION in spray painting for transportation equipment is the newest development of DeVilbiss Co. The Great Northern Railway Co. is the first to install a booth designed expressly for spray painting freight cars.

How It Works—Located at their St. Cloud, Minnestoa, shops, the booth replaces hand spraying with the installation of automatic transverse coating machines on the sides and a gang arrangement of automatic spray guns on the top of the unit.

PAINTING FREIGHT CARS
. . . cycle takes 12 minutes per car

Four freight cars are placed in the painting position. Workmen actuate the booth. Each car receives two coats of paint on both sides and on the roof. The ends of the cars are hand sprayed by workmen using extension spray guns. The complete cycle takes 48 minutes, or 12 minutes per car.

Car Ends—The booth has controls within easy reach of the operator and is equipped inside with platforms which can be raised or lowered to enable the operator to efficiently spray the ends of the cars.

The booth, a self contained painting unit, is equipped with its own compressors, air transformers and a circulating system which has a capacity up to 110 gallons of paint.

Selling Points—In addition to cutting down on the time consumed in the actual operation, use of the method provides for a uniform coating and dependable preservation. Material waste is reduced to a minumum, a factor important to tranportation companies. And finally, safety factors, including a CO-2 system, further enhance the application of the booth.

Aluminum Paint Uses

ALUMINUM PAINT gets the nod over paints with other types of pigments for many refinery applications in a recent report by engineers of Gulf Oil Corp.

The report says that since first tested in a two-year period prior to 1930, aluminum paint has been standardized for many major applications at their Port Arthur refinery. The report estimates that about 11,250,000 square feet of the plant surface was covered with aluminum paints.

Average Consumption—The annual average consumption of aluminum paint over the last five years was estimated at 6000 gallons, enough to cover some 2,250,000 square feet of surface each year.

Four economic advantages for the paint, as observed at Port Arthur, were ease of application, high spreading rates, excellent hiding of under-surface, long-term durability and attractiveness.

Valuable Qualities—The qualities of aluminum paint coating valuable to refining plants were also reported. These included corrosion and abrasion resistance, heat and light reflectivity and bright metallic surface.

Carbide Customer Training

A new training course in the design, use and application of cemented carbide tools is announced by Carboloy Department, General Electric Co., Detroit. Open to all interested individuals, the first of the 5-day sessions will begin on July 12.

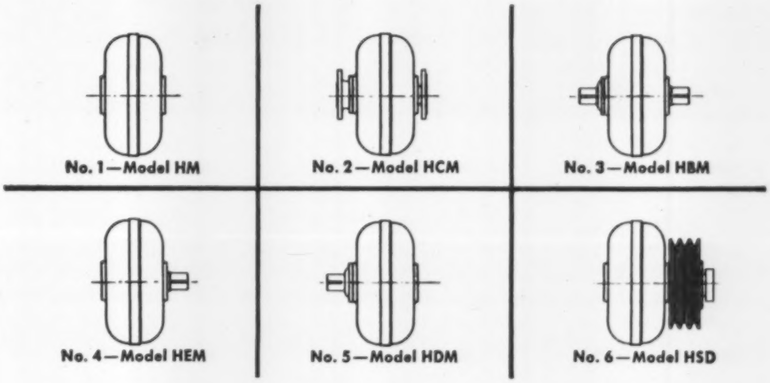
Lectures, demonstrations and lab sessions will cover brazing, design, grinding, chip breakers, rates of operation, interrupted cutting, reamers, trepanning, gun drilling, milling, machinability and tool control.

Which fluid drive is best for your job

With maintenance and downtime costs — from overloading powered equipment—standing out like a sore thumb in today's profit picture, the protection provided by fluid drives becomes critically important.

But the problem frequently arises: *which* model Fluid Coupling should be used? Twin Disc offers six different models, for motors or engines from ¾ to 700 hp, with a variety of input and output arrangements to fit any installation. *All* models prevent motor burn-outs or engine lugging—deliver full output torque in either direction—and permit motor or engine selection on economical basis of *running* requirements.

Thus the answer to *which* Fluid Coupling is your Authorized Twin Disc Hydraulic Dealer . . . backed by Twin Disc field engineering service. Consult your Dealer, or write Dept. DS, Racine, Wisc., for full details.



1 Basic Fluid Coupling unit with two support bearings. No input drive flange or output shaft. Sizes 14.5, 17.5, 21, 27.

2 Provides input impeller flange, flanged output shaft—both suitable for use with two halves of double engagement gear-type flexible coupling. Sizes 12.2, 14.5, 21.

3 Provides input stub shaft, straight output shaft, for use with standard Thomas Flexible Couplings on both input, output ends. Sizes 14.5, 17.5.

4 Provides straight output shaft. Permits use of special Thomas Flexible Coupling on input side; standard flexible coupling on output side. Sizes 14.5, 17.5, [illegible], 27.

5 Provides input stub shaft, permitting customer to make special output shaft to own specifications and use any type standard double-engagement flexible coupling on input side. Sizes 14.5, 17.5.

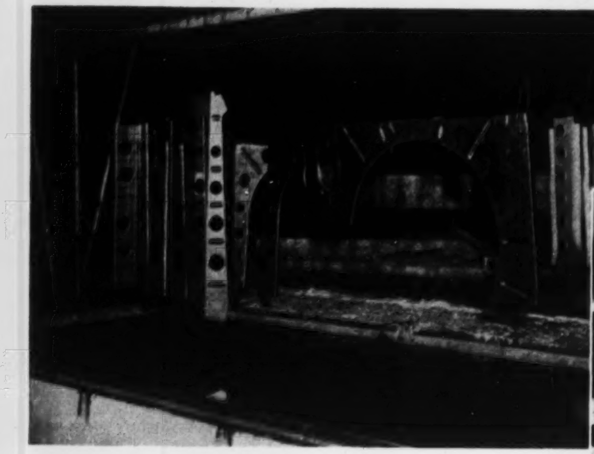
6 Provides input sleeve bored for standard NEMA motor shafts; tapered hub fits wide range of sheave diameters. Sizes 7.4S, 7.4, 8.4, 9.5, 10.6, 12.2.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

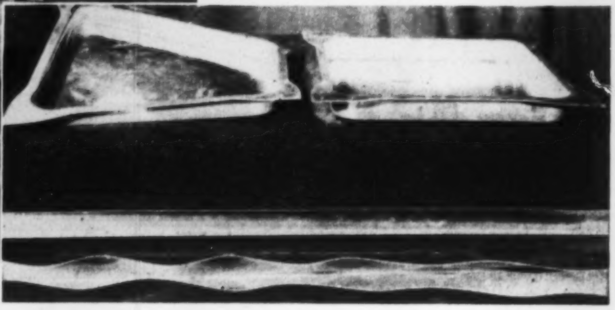
TWIN DISC

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa



Parts are shown suspended from rotatable tube over quench tank. When tube rotates, parts drop into water



Parts showing great distortion have been quenched in the normal manner, the others by the Free Fall process

Pipe Replaces Basket

IN HEAT TREATING PROCESS

Parts are suspended on wire in a pipe erected over salt bath and cold water tanks. After dipping, they are dropped in cold water tank. Distortion is reduced as much as 90 per cent

THEY'RE DOING something new in the salt bath furnace solution heat treatment of aluminum aircraft parts at the Glenn L. Martin Co. And the innovation is cutting up to 40 per cent of the time formerly consumed by this operation.

Called the Free Fall quench process, it changes only the method used in handling parts scheduled for heat treatment but offers many advantages over the customary method.

Previous Method — Aluminum parts placed in a basket were immersed in a molten salt bath for a given period, removed and immediately lowered into a running cold water bath. Since the large basket absorbed much of the heat of the salt bath, longer immersion for parts was necessary. And, the basket, when removed from the salt bath, carried with it a good deal of nitrate salt, necessitating frequent replenishment of the bath.

A second disadvantage came when the parts removed from the salt bath were dipped in cold water. Since the basket was lowered slowly, parts entered the cold water in stages and as the basket came in contact with this water it created a heterogeneous atmosphere of steam, air and water droplets caused by the splash.

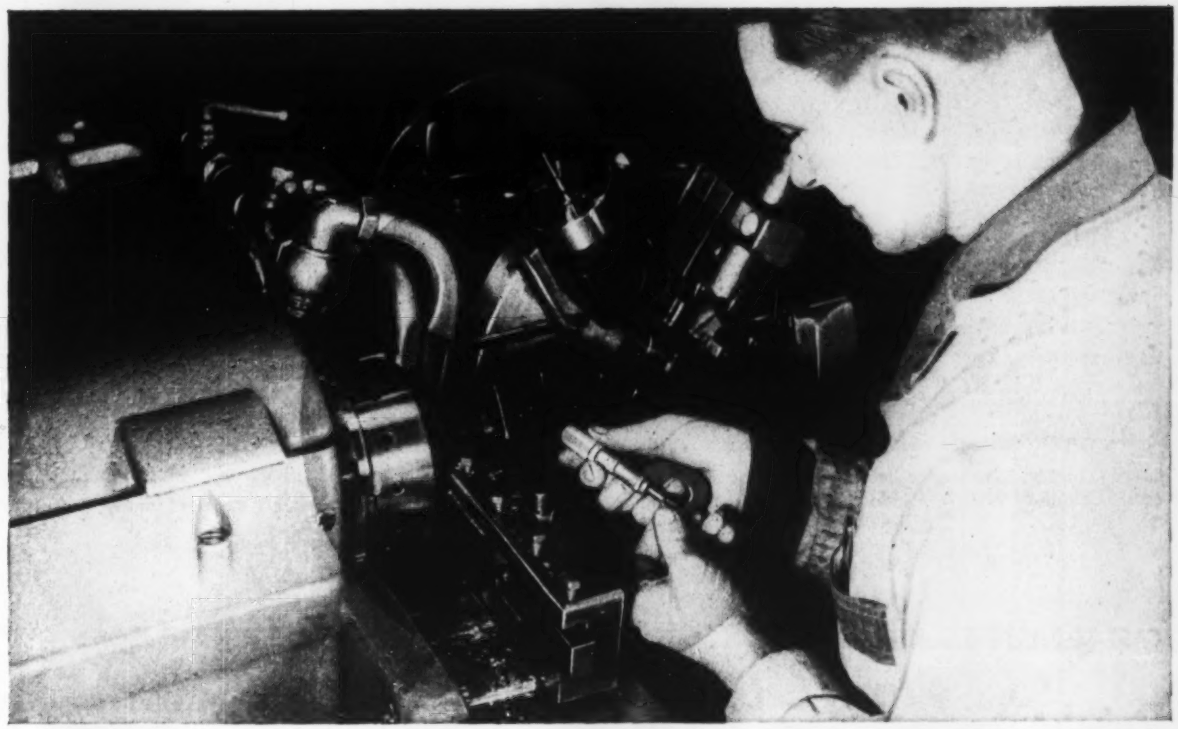
The droplets struck the aluminum parts and vaporized, absorbed heat locally and caused variations in the cooling rate of the part. Removal of the heat from the part caused the exposed surface to contract and become concave. Severe distortion of parts sometimes resulted. This distortion had to be removed by time-consuming hand benchwork.

Fall Process — With the new method, parts are suspended from a long pipe containing hanger pins. The pipe is erected over the tanks and rigged so it can be moved from tank to tank in the heat treating process. Parts are suspended by stainless steel wires. A loop on one end of the wire is designed to hang from the hanger projection on the pipe. The pipes themselves are equipped with a counterbalance that causes them to rotate when a trigger is released by the operator. When rotated, the parts suspended on pipe drop into bath.

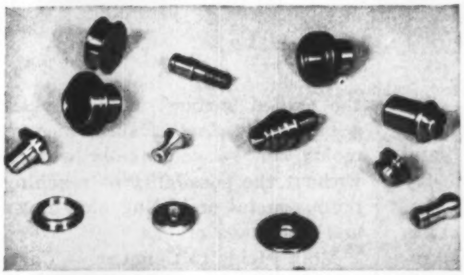
In the first stage of the operation, the pipe with the parts attached is lowered into the salt bath. From there, the pipe is raised, lifting parts from the bath. It then moves over the cold water bath and, when tripped by the operator, the pipe revolves, dropping parts into the cold water. Their speed and the angle at which they enter the water is such that a minimum amount of splash is created. After quenching, a basket previously placed in the cold water tank is lifted and the parts are removed.

Advantages — Nitrate salt does not need additions as often as before because there is no large basket to carry over salt. Also, the time required in this stage is shortened since no heat is lost on extraneous material. Perhaps the most important advantage is in the free fall aspect of the process. Because of the reduction of splash attendant to the entry of parts into the water, distortion is reduced by as much as 90 per cent eliminating a major part of the hand bench rework previously required.

The process has been in operation at Martin for some time. So far it has been found that both large and small aluminum parts can be more efficiently handled by this process and at a considerable savings in time and money.



TOOL LIFE INCREASED 40% USING CITIES SERVICE CUTTING OIL



ONE OIL FOR ALL? After poor results with many cutting oils, the Dunbar Machine & Tool Company discovered all their cutting jobs could be done to perfection using only one oil . . . Cities Service Chillo #44.

NO EYE STRAIN. In addition to a 40% increase in tool life, owner Robert Dunbar found that the transparent characteristics of Chillo #44 help eliminate eye strain. Cutting operation is easily visible to operator.

Production Also Up, Reports Dunbar Machine & Tool Co.

THE PROBLEM . . . The Dunbar Machine & Tool Company had a problem. It seemed impossible to find one oil which would perform economically and efficiently for ALL the jobs required of the firm's automatic screw machines.

THE SOLUTION . . . After trying many brands of cutting oil, "none of which gave good all-round performance," owner Robert Dunbar called in a Cities Service engineer. After careful analysis of the problem, the engineer recommended Chillo #44 cutting oil.

THE RESULTS . . . Using Chillo #44, the company observed these results: Tool life increased nearly 40% . . . Production increased accordingly . . . Additional savings realized due to chip draining characteristics of oil . . . Holding tolerances no longer any problem . . . Machine clean-up time now insignificant . . . Transparency of oil eliminates eye-strain . . . Less smoke and fumes at high speeds . . . Also excellent for lubricating purposes. Says Mr. Dunbar, "Our results with Chillo #44 permit us to heartily endorse this product."

If you have a cutting oil problem, consult your nearest Cities Service representative or write Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Pouring molten stainless at Jessop is a painstaking process. Company has two induction furnaces for melting

Casting workers tip ladle to fill carefully prepared molds. Application of steels reaches many industries

CAST-TO-SHAPE STAINLESS . . .

Bright Future for Precision Technique

These steels are a potential answer to many of the current problems of the die casting and plastic fields. Jessop develops special techniques to extend use

CAST-TO-SHAPE steel got its foot in the production door via the automotive industry, where it was used for forming, draw, blank and trim dies.

It made its entry in the glass industry in the form of mold and plungers about 11 years ago.

Now, this steel helps meet a demand of the television industry for higher quality molds to make bigger and better picture tubes.

Jessop Steel Co.'s story of development in this field started when glass companies sought molds of more exacting requirements for TV picture tube bulbs. Since the molds used to form television picture tubes must help produce perfect glass, it was necessary to have a structure that was absolutely sound, without the slightest pinhole porosity and one which could be polished to an extremely high degree.

Sound Structure Found — For many years Jessop was able to meet these requirements by sand casting. But, as the steel industry became more competitive and required still better glass, demands were made on them for further refinements.

Result was a process of chilling stainless plungers and molds—a production method of making castings that has been an important factor in improving the quality of television reception.

The design of the mold or plunger governs the type of chill used. It may be a one-part chill or a number of chills placed in certain positions adjacent to the working surface of the product to be chilled. To date, most of them have been made of iron; experiments are being made with graphite and steel.

It is possible to control the grain size to a depth of 1.5 inches under the chilled surface. This provides a big safety factor, since dies or molds can be continually worked without the possibility of reaching porous metal or hitting blow holes and shrinkage cracks.

More Fields to Conquer — Cast-to-shape steels promise to relieve many of the current problems in the die casting and plastic fields. They should cut down machining requirements and costs. Jessop is also using them to make molds and plungers for the baking line of glassware, lenses, electrical water meter covers and applications where a strong, clear glass is required.

These steels are also used extensively in tube forming, deep drawing of aluminum and stainless steels, as in jet engines. The appliance field, the utensil industry and agriculture are other areas of heavy application.

should you have your own SLITTING EQUIPMENT?

TORRINGTON STANDARD SLITTER

compact

easily operated

quick set-ups

any combination of cuts

cuts accurate to .001"

If you use sheet metal in a variety of special widths, Torrington precision slitting machines can help you earn these outstanding benefits in efficiency and economy.

☞ *With a Torrington slitter, you need buy only standard widths — simplify your procurement.*

☞ *You eliminate the need for large unbalanced inventories of cut-to-order material.*

☞ *You can broaden your sources of supply, get faster deliveries on shorter notice.*

☞ *With a Torrington slitter, you can effect immediate savings in your material handling.*

Torrington slitting machines are available in a wide range of sizes. Torrington also designs and builds accessory equipment such as winders, coilers, pay-off stands and loaders and unloaders. Call or write for full information on the slitting equipment best fitted to your particular needs.

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Straighteners • Flatteners
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Reduce Fire Hazards
Use HOUGHTO-SAFE
the hydraulic fluid that won't burn or explode!

HOUGHTO-SAFE gives you this 4-WAY SAFETY!

SAFETY FROM FIRE

Houghto-Safe won't burn or flash—even when sprayed into open flames! This new hydraulic fluid . . . rated "acceptable from the fire hazard standpoint" by the Factory Mutual Laboratories . . . now proves that fire-resistant qualities *can be obtained without loss in operating efficiency!*

SAFETY FROM WEAR

Houghto-Safe is reinforced for high film strength—longer life for moving metal parts.

SAFETY FROM TOXICITY

Houghto-Safe is non-toxic—safe to handle—has no unpleasant odor!

SAFETY FROM PACKING ATTACK

Houghto-Safe has no ill effect on synthetic rubber packings—won't impair efficiency! Ask the Houghton Man for our new bulletin, containing research data, case histories and pictured proof of Houghto-Safe's efficiency. Or write to E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa., for answers to any questions you may have about this new, safe, hydraulic fluid.

HOUGHTO-SAFE Non-Flammable Hydraulic Fluid
. . . a product of

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PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

Merchandizing On Wheels

TWO GIANT tractor-trailers that can quickly be converted into a self-contained traveling auditorium seating 100 people in scientifically lighted, air-conditioned comfort are unique in modern merchandising aids.

Standard Decor—The trailers, designed and built by Boyertown Auto Body Works for Armstrong Cork Co., are joined side-by-side to form a meeting rooom containing 1000 square feet of floor space. They are equipped with comfortable seats, a sound-conditioned projection booth, a stage, speakers' stands, three motion picture screens and elaborate three-dimensional displays.

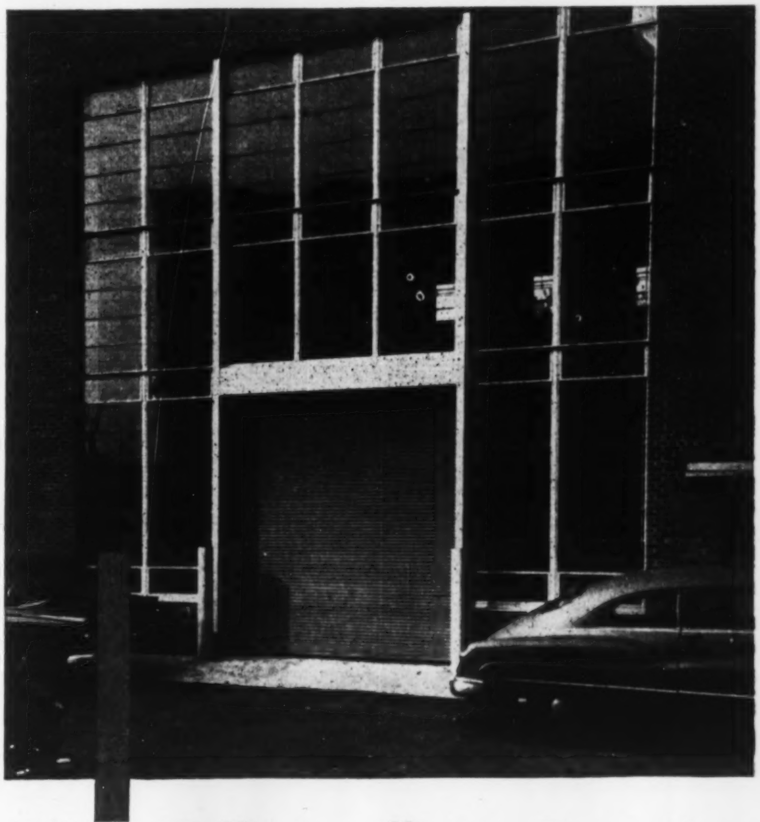
Six men can swing the self-propelled units into position, expand the trailer bodies and set up the works in less than 45 minutes.

On Tour—The Armstrong Motorcade is currently on an 8-month, 25,000-mile tour of 144 cities. At each stop their floor covering dealers will be given a 3-hour course in the mobile auditorium on the latest merchandising and sales ideas.

The theater is heated by 4 gasoline-driven heating units capable of producing 60,000 Btu's each which supply radiant heat throughout the entire floor. Units are independent of any outside source, for two 25-kw generators are mounted on the back of each tractor.

The Place for Vanadium

STEEL's article, "The Place for Vanadium," in the July 12 issue, p. 128, failed to credit the work of the author, C. Marvin Wayman, 1st Lt. USAF. Information on which this article was based came largely from Lt. Wayman's experience while acting as project engineer on USAF contract AF 33(038)-8517, Exploration of Vanadium-Base Alloys. Lt. Wayman also acknowledges the aid extended by Dr. William Rostoker, Armour Research Foundation, Illinois Institute of Technology, and by Dr. H. K. Adenstedt, formerly of Wright Air Development Center, in preparation of the article.



"Glass Wall" Installation Dramatizes Advantages of Kinnear Rolling Doors

Heavily Galvanized Doubly Protected

Kinnear Steel Rolling Doors are heavily galvanized (1.25 oz. of zinc per sq. foot, as per ASTM standards) to provide a lasting weather resistance. In addition Kinnear Paint Bond, a special phosphate application, provides for easy, thorough paint coverage and lasting paint adhesion.

Light from a huge "glass wall" floods into the new engineering building at Howard University, Washington, D.C., shown above.

The Kinnear Rolling Door centered in this glass wall can be operated or left open without blocking off a single inch of glass area.

The rugged curtain of interlocking steel slats — originated by Kinnear — coils compactly above the opening. All surrounding floor, wall and ceiling space remains clear and usable *all the time.*

Notice also how the straight lines of the Kinnear curtain add to the modern appeal of this building.

In addition to this space-saving "self-contained action", Kinnear Steel Rolling Doors offer durable, low cost, all-metal protection against intruders, vandals, wind, weather, and fire.

Kinnear Rolling Doors are built in any size, with manual or motor operation. Write for full details.

The KINNEAR Manufacturing Company

FACTORIES:
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SAVING WAYS IN DOORWAYS KINNEAR ROLLING DOORS

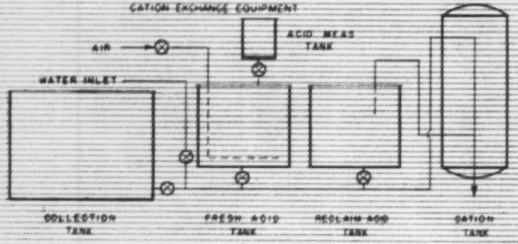

CATION EXCHANGE EQUIPMENT
AIR
WATER INLET
ACID MEAS TANK
COLLECTION TANK
FRESH ACID TANK
RECLAIM ACID TANK
CATION TANK

FIG 1

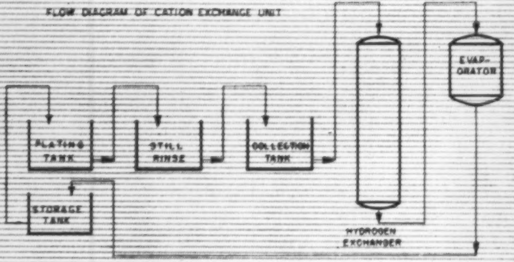

FLOW DIAGRAM OF CATION EXCHANGE UNIT
PLATING TANK
STILL RINSE
COLLECTION TANK
STORAGE TANK
HYDROGEN EXCHANGER
EVAP-ORATOR

FIG 2

WASTE PURIFICATION

Plater Profits Two Ways

Pontiac's plating waste reclamation system relieves a serious pollution problem, but also squeezes the last dollar from re-usable materials and sale of scrap

PURIFYING chromic acid in the still rinse by ion exchange, followed by evaporation to desired concentration, relieved a serious pollution problem at Pontiac Motor Division. Removal of contaminant metallic ions from the rinse solution is now carried out by cation exchange resin on the hydrogen scale.

The copper, nickel, chromium plating machine operated by Pontiac has a capacity of 34,000 sq ft a day. The plating department operates two shifts a day plating steel bumpers, bumper guards and grill parts.

Contaminants—Chromic acid solutions in this plating setup become contaminated as they are used, primarily by dissolution of metal of the work and of the auxiliary steel anodes on the racks. Contamination is present in the form of metal ions such as iron, copper and nickel, and plated parts are of such shape that drag-out is heavy.

However, because drag-out is heavy and solution loss has been replaced with pure chromic acid, contamination has been kept at such a level that plating solutions never have been discarded. At present, a still rinse is used immediately following the plating bath, where chromic acid concentration builds up to 8 ounces a gallon.

The stream pollution problem was created because loss of volume in the plating tanks is insufficient to permit complete transfer of the rinse water to keep down chromic acid solution in the waste.

Exchange Equipment — Illinois Water Treatment Co. designed and fabricated the ion exchange equipment for removal of contaminating metal ions from the chromic acid solution (Fig. 1). The equipment consists of a 3000-gallon collection tank, a 36 x 84-inch cation exchanger, two 54 x 48-inch acid solution tanks and a 30-gpm regeneration pump.

By ANTHONY J. D'ORAZIO
Assistant Chief Chemist
Pontiac Motor Division
General Motors Corp.
Pontiac, Mich.

TABLE NO. I

Removal of Catonic Contaminants from Chrome Plating Solution

	Rinse Tank	Collection tank after addition of 10 lbs $BaCO_3$	Solution from cation exchanger
CrO_3—oz/gal	8.03	8.14	8.14
SO_4—oz/gal	0.082	0.059	0.0604
Ratio	98:1	137:1	134:1
Fe—g/l	0.392	—	0.035
Ni—g/l	0.13	—	0.04
Cu—g/l	0.14	—	0.04

About 90 per cent of the iron is removed by the exchanger

TABLE NO. II

Economic Analysis of One Cycle

Material	
Sulphuric acid 66°Be' @ $0.013 per pound; requiring 330 pounds	$4.40
1600 gallons of water @ $0.11 per 1000 gallons	.16
Steam	15.00
Direct labor—4 hours @ $2.00 an hour	8.00
	$27.16
Value of chromic acid recovered— 1100 pounds @ $0.30 a pound	$330.00
Savings	$302.84

Exchange equipment has been designed to treat 3000 gallons of solution containing 8 ounces per gallon chromic acid. It was determined that at this concentration the metal oxides are in concentration of 0.76 gram per liter. The cation exchanger treats this solution at a flow rate of 25 gpm.

Reclaim Cycle — When chromic acid in the rinse tank reaches a concentration of 8 ounces a gallon, 2500 gallons of the contaminated solution are pumped into a collection tank. It's desirable to raise the chromic acid-sulphate ratio of the solution in the storage tank, so 10 pounds of $BaCO_3$ are added in the collection tank. Solution is agitated and allowed to settle overnight.

Supernatant liquid is pumped through the cation exchange unit at 25 gpm into a Pfaudler glass-lined vacuum evaporator where it is concentrated to plating strength, pumped to the storage tank and added to the plating bath as required. Condensed water from the evaporator is collected in a storage tank, pumped to the still rinse tank (Fig. 2).

Cycle is completed when the cation exchanger is "sweetened off" and backwashed with water, and sulphuric acid from the reclaim tank is pumped through the unit.

Evaporator Operation — The evaporator is a 3000-gallon glass-lined steel tank with a steam pocket. Vacuum used is 23 inches of mercury induced by a Croll-Reynolds steam exhauster. Steam at 75 psi heats the evaporator's steam jacket.

When chromic acid from the exchanger enters the evaporator unit, exhaust is set in motion. Solution is evaporated to about 400 gallons, making chromic acid concentration about 45 ounces per gallon. Vacuum then is released and concentrated solution pumped to the storage tank. About 200 gallons of water an hour are distilled, requiring 10 hours for a complete run.

Minimized Cost—Generally, it is recognized that pollution abatement operations cannot be operated profitably. However, in addition to eliminating a chromic acid waste disposal problem, we were able to purify and reclaim approximately 550 pounds of the chromic acid daily with the cation exchange unit.

Before, chromic acid solutions were kept clean because drag-out exceeded rate of contamination, with drag-out replaced by pure chromic acid. Now the same job is done by use of purified chromic acid solution without increasing plating problems.

Nickel Plating System—Solution from the reclaim rinse tank in the acid nickel plating system is pumped into a treatment tank once a week. Rinse tank capacity is 3000 gallons; solution concentration, after five days of operation, builds up to 1.70 ounces per gallon of nickel.

Enough carbon is added in the treatment tank to purify the solution. Then, nickel carbonate is added to attain a pH of 5.0, solution is heated to 150°F and carbon settled out. After filtering, it's pumped into a glass-lined vacuum evaporator and concentrated to plating strength. Pumped into storage, concentrated solution is added to the plating bath as required. This process reclaims about 320 pounds of nickel a week.

Copper Plating System—Solution from the acid copper plating system's reclaim rinse tank is pumped into a glass-lined evaporator twice a week. There it's evaporated until about 400 gallons remain in the still. Concentration is 24 to 32 ounces per gallon of copper sulphate, depending on whether reclaim rinse is held two or three days.

Concentrated solution is pumped into one of two rubber-lined deplating tanks and copper is plated out, using lead anodes and used copper anodes as cathodes. Result is reclamation of about 700 pounds of copper per week, which is sold as scrap.

Adapted from a paper presented by Mr. D'Orazio at the Ninth Industrial Waste Conference, sponsored by Purdue University.

NATIONAL AIROIL
TYPE "S-A"
STEAM ATOMIZING
OIL BURNER

VIRTUALLY IMPOSSIBLE FOR ANYTHING TO CLOG OR GO WRONG . . .

. . . SEE FOR YOURSELF!

The popular NATIONAL AIROIL Steam Atomizing Oil Burner *thoroughly atomizes* and *completely burns* the lowest and cheapest grades of fuel oil or tar . . . requires only minimum supervision and maintenance. Only slight oil pressure and temperature is needed . . . and internal atomizing venturi feature assures a low steam consumption. NATIONAL AIROIL Type "SA" Oil Burner is adaptable to all types of industrial heating, power or process furnaces . . . is suitable for firing above stoker grates on conversion to oil.

Other "SA" modifications designed for: the burning of Colloidal fuel ("SAR") — Large capacity operation ("SAL")—Sludge burning ("SAD")—Combined steam and mechanical atomization (Dual Stage).

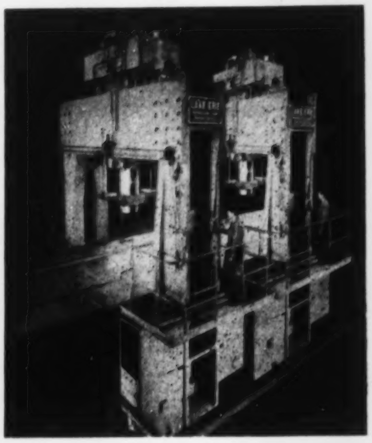
WRITE FOR BULLETIN 21

OIL BURNERS and GAS BURNERS for industrial power, process and heating purposes
STEAM ATOMIZING OIL BURNERS
SLUDGE BURNERS Steam Atomizing
MOTOR-DRIVEN
ROTARY OIL BURNERS
MECHANICAL PRESSURE ATOMIZING OIL BURNERS
DUAL STAGE, Combining Steam and Mechanical Atomization
LOW AIR PRESSURE OIL BURNERS
NAIROIL AUTOMATIC OIL BURNERS, for small process furnaces and heating plants
GAS BURNERS
COMBINATION GAS & OIL BURNERS
FUEL OIL PUMPING and HEATING UNITS
FURNACE RELIEF DOORS
AIR INTAKE DOORS
OBSERVATION PORTS
SPECIAL REFRACTORY SHAPES

NATIONAL AIROIL BURNER CO., INC.

1392 EAST SEDGLEY AVE., PHILADELPHIA 34, PA.
Southwestern Division: 2512 South Boulevard, Houston 6, Texas

INDUSTRIAL OIL BURNERS, GAS BURNERS, FURNACE EQUIPMENT



Twin Carriage Press

This 2000-ton Lake Erie traveling-head press is used to straighten castings 22 x 10 feet. Twin heads each deliver 1000 tons of force. Its individual carriages allow independent longitudinal movement and each head can be transversely positioned. Press permits straightening operations over an area that can extend to 267 sq ft

---

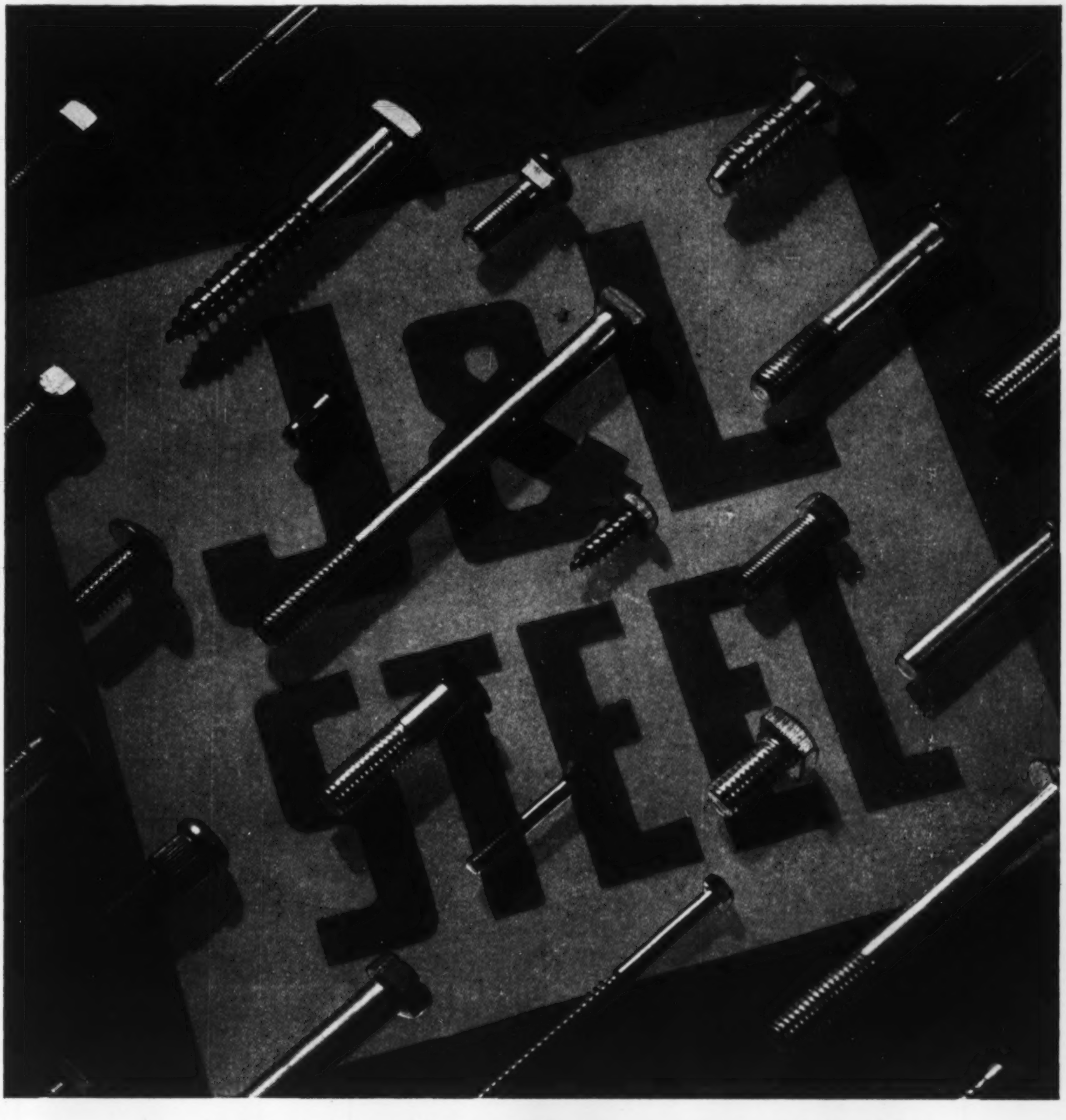
Automatic Indexing

WITH A production capacity of 124 pieces an hour, a 5-way automatic indexing machine manufactured by Buhr Machine Tool Co. features special milling heads which are arranged with automatic backup. This inhibits cutters from disturbing the close microfinish on their return stroke.

Physical Details—This machine also features loading the part in two positions in each fixture. An attached tool board helps to minimize the tool-changing time. Hydraulic and electrical installations are designed to J. I. C. standards.

All multiple heads are of their ball bearing construction with shaved gears and broached-and-splined drives. Tapping spindles are of the lead-screw type with precision-ground and hard chrome-plated threads. Automatic index is electrically controlled and of the cam-and-roller type to assure uniform acceleration and deceleration of indexing movement.

Standard features, including interchangeability of parts, are included. It was designed for use on automatic transmission parts, performing 18 operations on transmission Servo Bodies.



Get Production, Economy, Quality with J&L Cold Heading Wire

More and more profit-conscious wire users are turning to J&L for Cold Heading Wire that helps them get increased production, top quality and operating economy. They've found that J&L furnishes wire with—

- **High Plastic Deformation**
- **The Right Finish**
- **High Cold Malleability**
- **The Utmost Uniformity**

. . . in other words cold heading wire that consistently has the right chemical and physical properties.

The dependability of J&L Cold Heading Wire is the result of quality control from ore to finished product, rigid testing, modern equipment and over a hundred years of iron and steel-making experience.

Contact J&L and investigate the economies of using J&L Cold Heading Wire in your operation. Remember, it's tops in quality—competitive in price.

Jones & Laughlin
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WHEN YOU BUY STEEL FROM WAREHOUSE, YOU GET:

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A large steel inventory has many disadvantages. It ties up your capital, it takes up excessive space in your plant, and if product specifications are changed you may be caught with it. You can avoid all three situations by letting U.S. Steel Supply act as your warehouse. We will stock the steel you need, cut it to your specifications, and ship it to your plant or job site in the quantities you need. Your U.S. Steel Supply salesman can work out a convenient steel stocking and delivery schedule for you.

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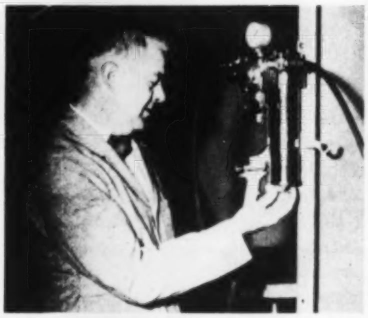
NEW PRODUCTS and equipment

Reply card on page 147 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Oil, Moisture Sparator

. . . for compressed air

An oil and moisture separator for cleaning of compressed air is available with or without a regulating device. The P-HLE is a high capacity 50-cfm with power regulation assuring steady uniform air delivery.



The combination unit, embodying separator and regulator, will regulate pressures up to 135 psi from an air line carrying pressures up to 250 psi. The unit is 15 x 8½ x 8½ inches. The oil and moisture separator is sold with or without the regulator. DeVilbiss Co.

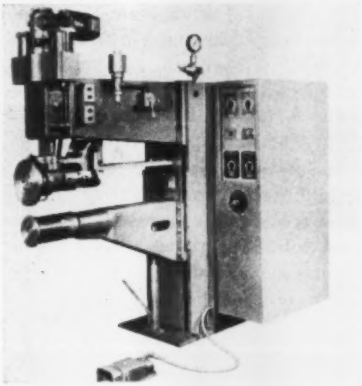
FOR MORE DATA CIRCLE REPLY CARD NO. 1

Seam Welder

. . . makes high quality welds

The MP 2 machine is one of a series of single phase seam welders available in 100 kva, 150 kva, 200 kva at 50 per cent duty cycle. It can be supplied from 18 to 48 inches throat depth and 1500 pounds to 3000 maximum electrode force dependent on throat depth.

It is said to make higher quality welds on large production runs on two thicknesses of clean mild steel in minimum gages of 0.021 and maximum 0.109 inch; on stainless steel in minimum gages of 0.031 and maximum gages of 0.019 inch. By varying weld time, weld current and electrode force, heavier gages can be joined at slower speeds. Sciaky Bros. Inc.

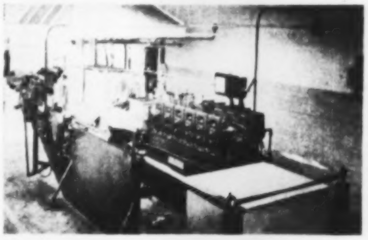


FOR MORE DATA CIRCLE REPLY CARD NO. 2

Radiator Tube Mill

. . . for non-stop rolling

This radiator tube mill consists of a coil-holding reel, an electric brazer for joining the ends of coils and a stock reservoir to permit the brazing of the end of the coil to be run to the leading end of the new coil without stopping the rolling.



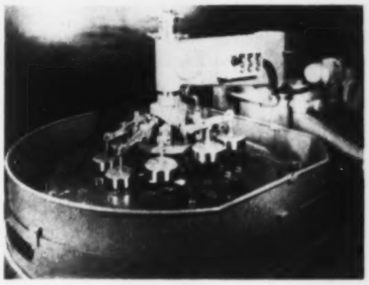
The next unit in the line is a cold roll forming machine for forming an elliptical lock seam tube with the seam on edge; a continuous tinning machine; a roll straightener and an automatic cutoff machine. In tests at their factory the cutoff was tested at various speeds up to 300 fpm. Kane & Roach Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Lapping Machine

. . . more pieces per hour

The No. 36-F Hyprolap, with semi-automatic feed, is designed to produce more pieces per hour than former machines as a result of the provision for continual lapping and the complete lapping of the work in a single pass around the lap.



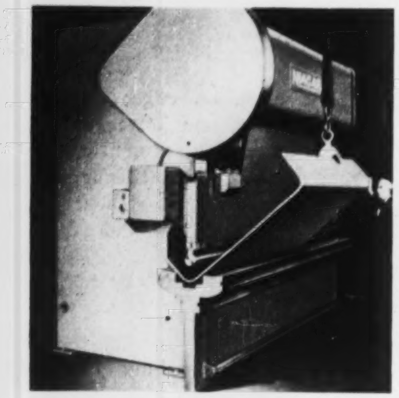
In normal operation, the operator merely loads with his right hand and removes the finished pieces with his left. A work pressure arrangement automatically applies the proper weight to the parts. It can be arranged for fully automatic continuous feed operation by the addition of suitable loading and unloading devices. Norton Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 4

Press Brakes

. . . for uniform bends

To assure uniform bends with straight-edge accuracy, double end twin drives with double reduction gearing provide uniform, constant application of power in all models of the newly designed line of press brakes. Rugged streamlined frames feature box-type crowns to provide maximum resistance to deflection and permanent alignment of bearings and ram.



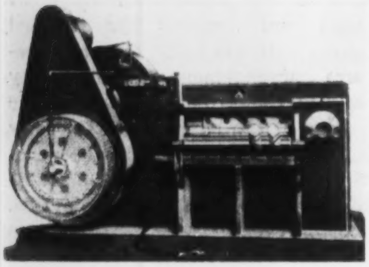
Laminated non-metallic ways reduce wear to a minimum. All gearing is totally enclosed in sealed oil baths for thorough, clean lubrication. An extensive line of press brake dies is available for use with each of the models in the complete, 50 to 775-ton press brake line. Niagara Machine & Tool Works.

FOR MORE DATA CIRCLE REPLY CARD NO. 5

Billet Shear

. . . employs lever principle

A billet shear for the production cutting of metals in rounds, squares, flats, angles, channels, I beams and special shapes, employing the principle of the lever and mechanical advantage to make heavy cuts with a small input of power is announced by the Canton Division. It is designed so that heavy cutting will be done near the fulcrum point of the lever arm with a mechanical advantage of approximately 5 to 1.



It will mount 36-inch long knives. The shear is designed with lever arm of cast steel and a bed of heavy welded steel plate. One of the outstanding features is the patented knife seat construction permitting quick, accurate setting of blades. Hill Acme Co.

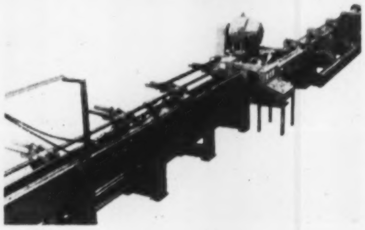
FOR MORE DATA CIRCLE REPLY CARD NO. 6

Straightener

. . . automatic or manual

A straightener designed with feeding and delivery equipment for straightening tubes from ½ to 3½ inches OD in varying lengths, operates either as a completely automatic cycle of feed and delivery or manually from a control pulpit, on a step-by-step basis.

It employs the 5-roll principle of straightening in which a central pressure roll is located between two sets of opposed rolls, each set having one driven roll and one idler roll. The entry table is a wood lined U-shaped trough, adjustable for height. The exit table is L-shaped wood lined trough adjustable sideways and for height. They operate manually or automatically. Sutton Engineering Co.



FOR MORE DATA CIRCLE REPLY CARD NO. 7

Bright Nickel Process

. . . uniform deposition

A bright nickel process introduced, called Wabrite, allows extremely high tolerances for impurities without impairing the quality of finish.

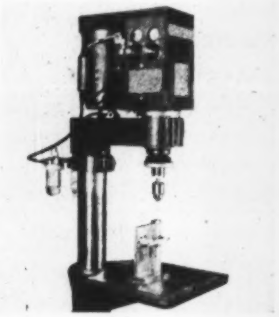
Excellent throughing power (up to 100 amps per sq ft) permits uniform plate deposition into recesses. In addition, it furnishes a highly active nickel deposit, ideal for subsequent chrome plating. Conversion of present baths to Wabrite is made without loss of nickel bath or primary brightness. Wagner Bros. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

Drill Unit

. . . with timer combined

Series 24 automatic drill unit is equipped with repeat cycle timer attachment for deep hole drilling. Combination of timer and drill unit make a low cost automatic deep hole drilling machine. Timer electronically withdraws drill at set intervals to clear chips.



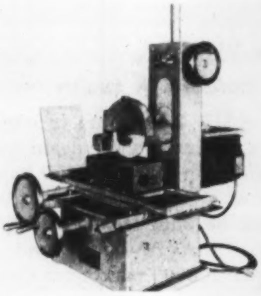
Rotary table offers many setup possibilities particularly on small part drilling and tapping operations. Fixtures can be permanently mounted to table and used as required. Dumore Co. Inc.

FOR MORE DATA CIRCLE RTPLY CARD NO. 9

Surface Grinder

. . . rigidity for heavy cuts

Rigidity and power for heavy cuts, combined with high sensitivity for precision finishing are features of the Butterfly precision surface grinder SG-48. Axial and radial rigidity of the spindle are accomplished by mounting at both ends in duplex-mounted super-precision angular-contact ball bearings. Spindle is dynamically bal-



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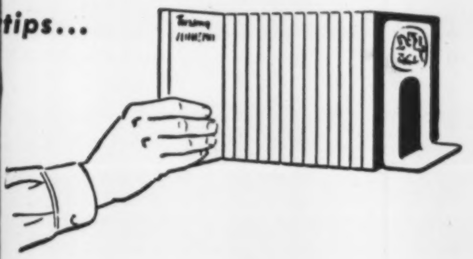

These valuable handbooks belong on the desk of every engineer, designer and production man. Single copies of any or all of them are free when requested on business letterhead. Otherwise each book is one dollar.

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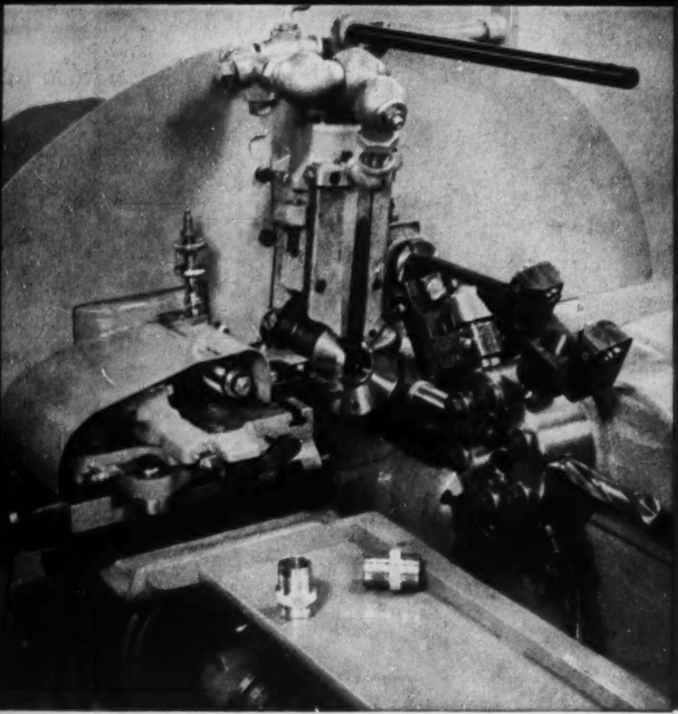
REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND • *More Information on Next Page*

Up Goes Output...



Down Go Costs

when you use

REYNOLDS ALUMINUM SCREW MACHINE STOCK

Aluminum alloys are excellent for screw machine work because, job for job, they machine at greater speeds and feeds—with standard tools, or with slight modifications for the higher speeds. That means a *step up* in production, and it's easy to see how your unit costs for material, handling and shipping *step down* with strong, lightweight aluminum that gives you three times the number of pieces per pound. Rust-free aluminum often requires no finishing but, when needed, takes most of the regular metal finishes . . . also permits a wide choice of attractive anodized finishes in natural tones and sparkling colors.

For prompt delivery on aluminum screw machine stock plus design and fabrication engineering service when you need it, call your nearby Reynolds Office or distributor listed under "Aluminum" in your classified telephone directory. They'll also show you how you can increase your sales and save your customers money if you submit alternate quotations based on aluminum when other materials are specified. For more complete information write on business letterhead for your free copy of the 124 page handbook, "Machining Aluminum Alloys," and index of Reynolds Literature. Reynolds Metals Company, 2520 South Third Street, Louisville 1, Kentucky.

SCREW MACHINE ALLOYS

11S-T3—Free machining. Fine finishes at high speed. Free cutting, fine chips, good strength. Excellent for screw machine work. Longer tool life but slightly less strength than 17S-T4. Good formability of machined parts.

17S-T4—Excellent finishes. Fine for general purpose machining. Good corrosion resistance and strength.

SPECIAL MACHINING ALLOYS

24S-T4—For simple machine work. Chips long and curled. Stronger than preceding alloys. Smooth finishes.

61S-T6—Good corrosion resistance, weldability, strength. Lower machinability. Best formability and suited to electro-chemical finishes.

2S and 52S—Higher purity aluminum alloys available for special applications. Have good formability.

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND • More Information on Preceding Page

anced; powered by a $\frac{1}{3}$-hp 3450-rpm motor, rubber-cradled on resilient base.

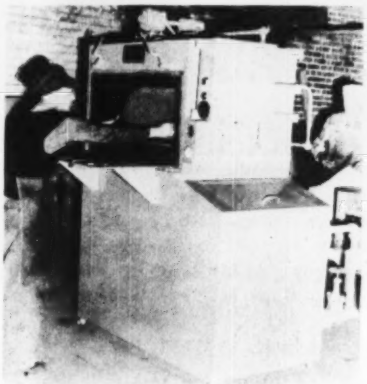
Ways are ground and lapped for accurate movement. Handle wheels are conveniently located for easy use. Harvey Mfg. Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 10

Washing Machine

. . . gas or steam operated

Drum cabinet model 30 x 20, this washing machine is compact, is designed heated by either gas or steam heat. It has a tumbling mesh drum for small stampings and a rocking cradle that will hold baskets of machine parts.



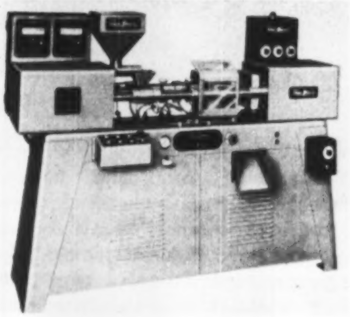
Operation is simple. Machine is 4 feet 6 inches wide and 7 feet high. Industrial Washing Machine Corp.

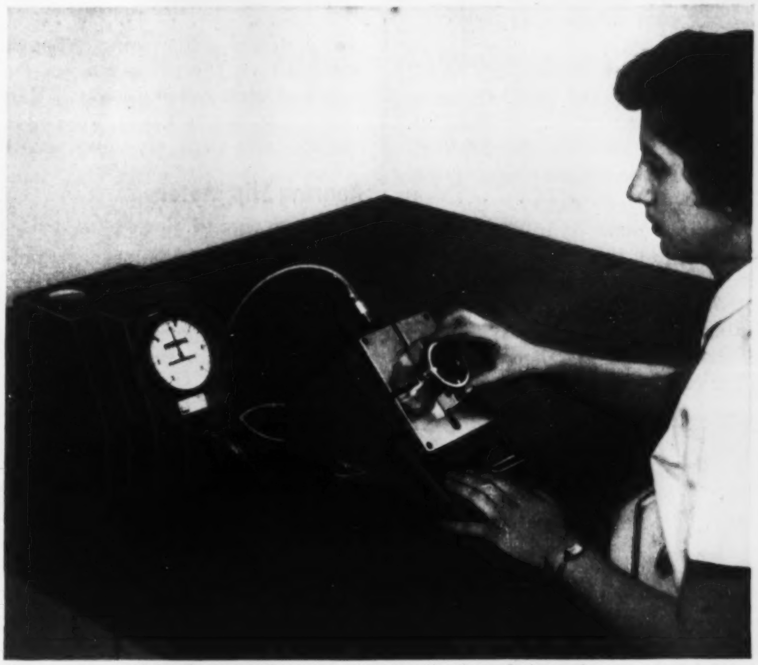
FOR MORE DATA CIRCLE REPLY CARD NO. 11

Plastics Molding Press

. . . is fully automatic

Model H-250, $2\frac{1}{2}$-ounce capacity fully-automatic press, will plasticize over 22 pounds of material per hour and attain up to





New AirProbe extends economical application of air gaging to more dimensional control problems. Here, a new Federal AirProbe . . . no larger than a regular cigarette . . . is combined with the well-known Federal Model 36 B-6 Bench Hole Gage and a Dimensionair.

Costly Air Gages No Longer Needed?

Air Gaging need no longer be expensive. The advent of the new Federal AirProbe makes it possible to make an air gage out of practically any regular Federal catalog gage. It is not *always* necessary to design a completely special air gage. This, plus the very reasonable price of the Federal Dimensionair and of the AirProbe, greatly extends the possibility of gaging by air.

This new spindle-like device can be incorporated in most Federal Catalog Gages. Direct readings of dimensional variations are then indicated on the precisely calibrated dial of the Federal Dimensionair. With such economical combinations now available, why be hasty about spending time and money on specially-designed and built air gages? Investigate first!

Your investigation may surprise you! If you have been quoted on special air gages, you'll be surprised at how little a Federal AirProbe combination costs. You may even learn that air gaging is not required at all . . . that a Federal Catalog Dial Indicator Gage can do the job!

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Our new booklet "A Management Blind Spot" reveals unappreciated shop situations and tells how they can be corrected. For your copy, write Federal Products Corporation, 4217 Eddy Street, Providence 1, R. I.

Ask FEDERAL

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Machine Size Control.

720 cycles per hour (dry run). Water cooling of the injection plunger, transfer hopper and oil cooler contributes to the high efficiency of the press.

For greater safety, the incorporated mold hydraulic mechanism makes the press non-operative unless the molded part is completely ejected. Purging to change material or color is easy due to accessibility of the simple platen clamp device. Featuring all-steel construction, the press can also be operated semi-automatically. Van Dorn Iron Works Co.

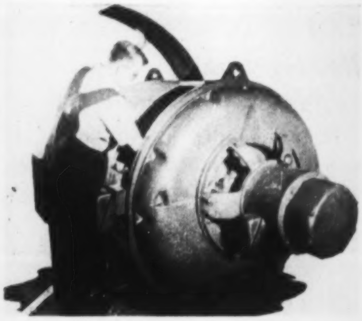
FOR MORE DATA CIRCLE REPLY CARD NO. 12

Bearing Slip Motor

. . . redesigned line

Redesign of its line of large end-shield bearing synchronous and wound rotor induction motors of four and more poles has been announced by Allis-Chalmers.

The redesigned motors (Types AB and ANY) utilize the same capsule bearing and cast end-shield construction featured in the company's standard large squirrel-cage induction motor line. The fabricated-steel stator yoke has been lengthened to accommodate slip rings and brush rigging with access openings of ample proportions for brush inspection and maintenance. Rotor or slip-ring leads are not exposed in the new design. Allis-Chalmers Mfg. Co.

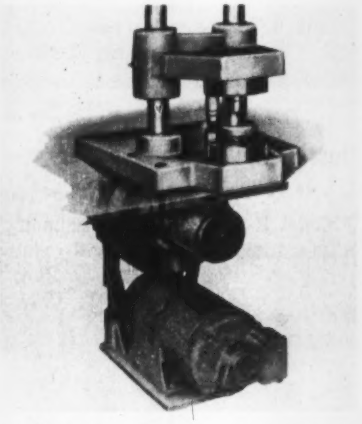


FOR MORE DATA CIRCLE REPLY CARD NO. 13

Press Unit

. . . needs no die sets

The Power-Di press unit eliminates the need for die sets, since punches and dies of any shape may be mounted in retainers which are automatically aligned in opposing ram and bolster members.



Units are compact, complete and self contained, 1-ton capacity, 1¼-inch standard stroke, 3 to 6-inch shut height, 200 strokes per minute. Swanson Tool & Machine Products Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

WEBB PLATE FABRICATING MACHINERY

Steelworkers ALL STEEL CONSTRUCTION

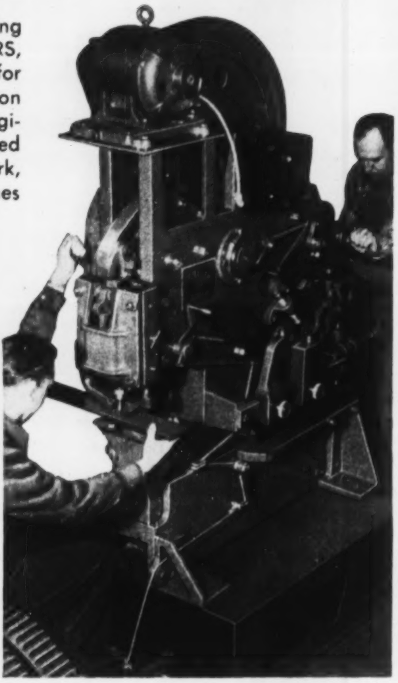
The Webb Corporation, in presenting the line of new WEBB STEELWORKERS, has designed versatile machines for either job-work or high production work. These units have been engineered to meet the particular need of shops having a variety of work, with a result that all-purpose machines are now available.

Five Complete Tools are Incorporated in a Single Unit.

1. Punch for plate, bars or structurals.
2. Cuts angles and tees with straight or miter cut.
3. Cuts off round and square bars.
4. Shears plates and bars.
5. Coping or notching attachment.

One of the main features of these machines is that they are at all times in complete readiness to do any of the above operations and to do the work well.

The punch may be operated at the same time as either the section cutter, bar cutter, shear or the coping and notching attachment . . . therefore, two operators can work at this machine simultaneously without interference. For illustrated literature and prices, write Dept. D.



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SLIP ROLLS

PYRAMID TYPE ROLL

INITIAL TYPE ROLL

STEELWORKERS

Also Manufacturers of INDUSTRIAL WEIGHING EQUIPMENT

Since 1881 THE WEBB CORP.

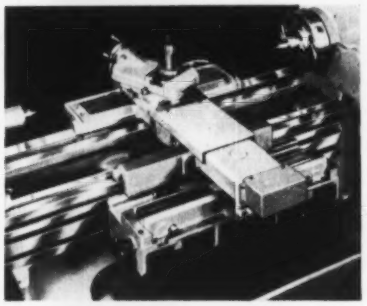
WEBB CITY, MO., U. S. A.

Lathe Taper Attachment

. . . greater rigidity

The lathe taper attachment for use on their Model C precision toolroom lathes permits taper cuts of 20 degrees included angle and 15 inches in length on the 12-inch lathe or 18 inches in length on the 16-inch lathe.

Preloaded balls riding on hardened and ground bearing surfaces completely eliminate longitudinal play while two of the four bearings in the taper bar shoe are mounted on eccentric studs thus allowing adjustment and preventing transverse play. The taper bar itself is bolted to the lathe bed by means of four T bolts providing greater rigidity than previously. Pratt & Whitney, division of Niles-Bement-Pond Co.

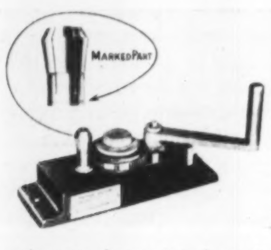


FOR MORE DATA CIRCLE REPLY CARD NO. 15

Marking Machine

. . . for low cost production

Designed for low cost production, the Model GRD-950-1 marking machine will stamp almost any size of round part. It consists of four primary elements: A cast steel base, with side flanges for bolting to a bench; an arbor for holding the pieces to be marked; a roller marking die; a gear-mounted handle. When the handle is turned, the gear arrangement causes the die to rotate with the piece held in the arbor, with the lettering rolling into the part.



Arbors are furnished for any tube size, but it's unnecessary to use a different arbor for every ID size.

The roller marking die may be either solid or insert style. Type capacity depends on size of character to be used. Either single characters or logotypes may be fitted into insert style dies. M. E. Cunningham Co.

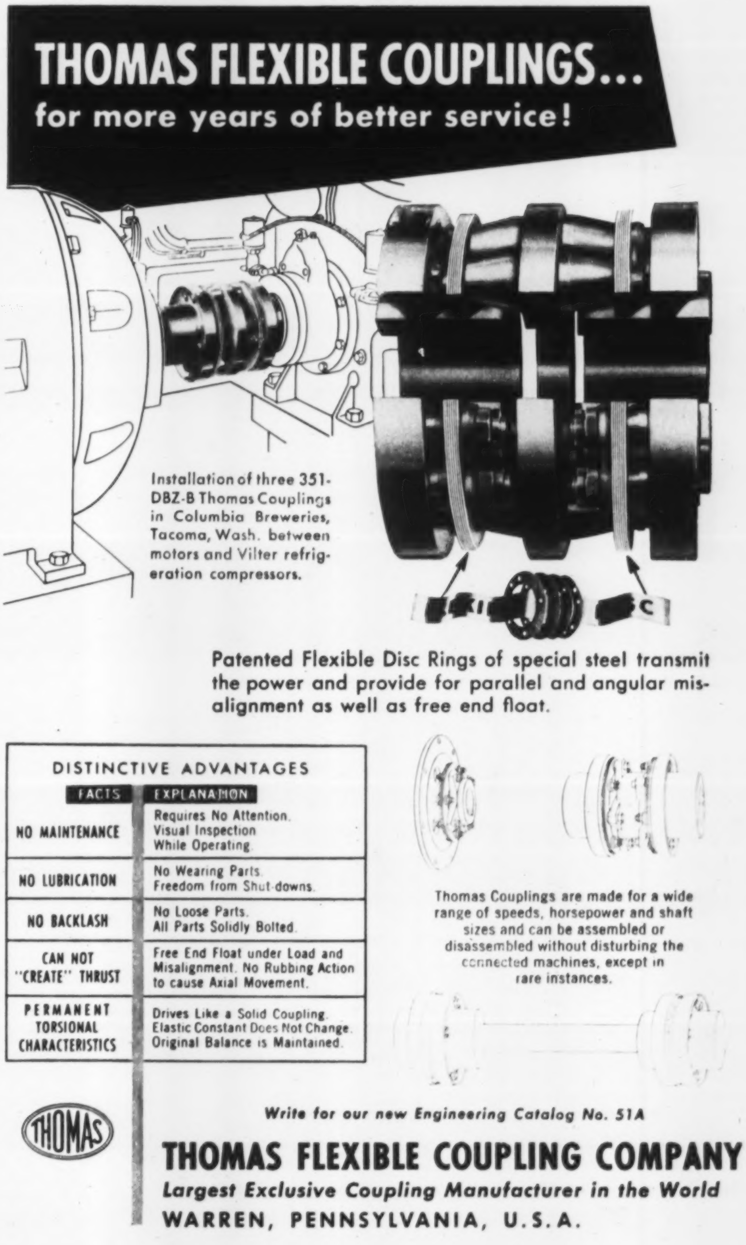
FOR MORE DATA CIRCLE REPLY CARD NO. 16

Strippable Coating

. . . can be re-used

A low cost, transparent strippable coating of the water-white type protects surfaces and edges of metal tools, parts and finished products from corrosion and abrasion during storage, handling and shipping. It is a crystal clear, plastic coating known as Thermo-Cote K.

A butyrate-base coating permitting low temperature application



THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

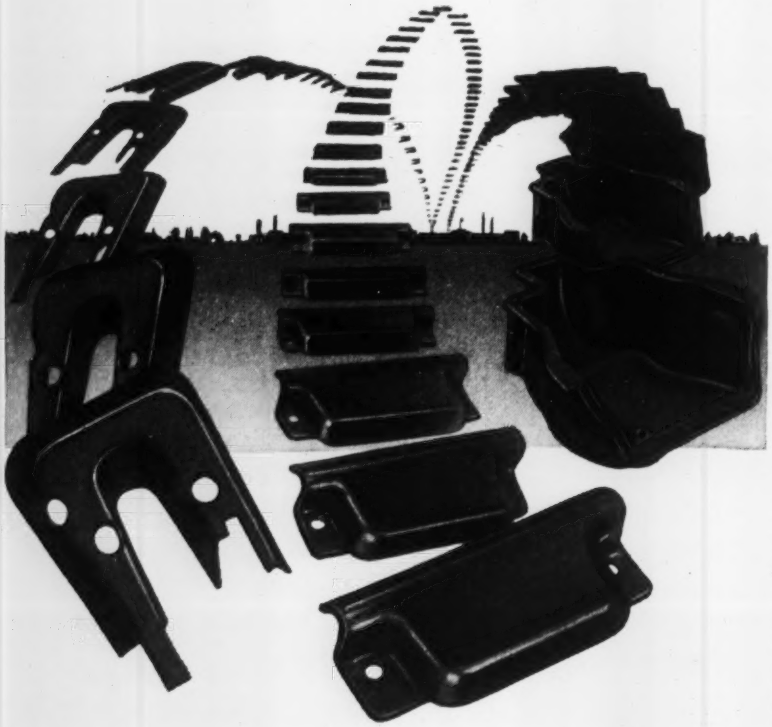
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for our new Engineering Catalog No. 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.



Medium and Heavy Stampings

Mass-Produced at a Profit *To You*

Home appliances, business machines, automotive products — just a few of the fields where Geometric Stampings are reducing costs for alert manufacturers. (Weight and cost savings of 50% are common.)

Maybe you, too, are using forged or cast parts which can be made better, lighter and cheaper as stampings. Geometric engineers, with long experience in the analysis of all kinds of medium and heavy stamping problems, are glad to help you find out — no obligation, of course.

Write today for free booklet — "Geometric Craftsmanship"

Geometric Craftsmanship

GEOMETRIC STAMPING CO.

A Subsidiary of Barium Steel Corp.

1130 E. 200th Street Cleveland 17, Ohio

at 300° F, it is supplied in small blocks and is melted and brought to proper dipping temperature in a thermostatically controlled melt tank. It forms a shiny transparent, skin-tight covering for products dipped in it. It is quickly removed by slitting and peeling and usable again. Bischoff Chemical Corp.

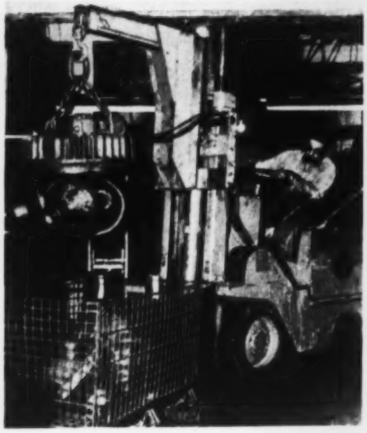
FOR MORE DATA CIRCLE REPLY CARD NO. 17

Electro-Magnets

. . . for materials handling

A line of small electro-magnets is designed for use with mobile materials handling systems. These magnets can be used with boom-equipped gas or electric industrial trucks and, in some applications, can be attached to lift truck forks.

They will lift coiled stock, castings, billets, pipe, slabs and batches of small parts as well as loose scrap. When not in use for lifting and transporting units, they can be utilized as floor-type sweepers for ferrous scrap. They are furnished in sizes ranging from 12½ to 36 inches in diameter and weighing 155 to 1900 pounds. Electric Controller & Mfg. Co.



FOR MORE DATA CIRCLE REPLY CARD NO 18

Fume, Dust Control

. . . moving granule principle

Control for fumes, dust and smoke is accomplished by a unique moving granule principle, in the Dorfan Impingo Filter. It is adaptable to the air and fume systems

INDUSTRIAL WIRING

FEWER SPLICES need be made when you run "all purpose" Durasheath. It can be run buried, overhead, in ducts . . . in one continuous run.

New trend in industrial wiring: Neoprene jacketed cable

Users find this tough, long-lasting "premium" cable actually costs little more to use . . . then cuts upkeep.

A chemical plant in Texas uses ANACONDA Durasheath* neoprene jacketed cable *as building wire* for power and lighting. A plant in St. Louis does, too. Another in Chicago.

The practice of using versatile Durasheath for building wire has caught on from coast to coast. And there's good reason.

This cable costs little more to use than the cheapest cable you can buy—and more than makes up this difference in long trouble-free service, lower maintenance costs!

Durasheath's tough jacket is made of specially compounded neoprene. It shrugs off heat, moisture, corrosive fumes. And it takes rough handling in stride. As demand for electricity rises, Durasheath provides added reliability.

Industry engineers call Durasheath "good insurance." And it is!

Durasheath comes in all sizes, single and multiple conductor, copper and aluminum from 600 to 15,000 volts. You can run it in the ground, overhead, in damp ducts in *one continuous run* with minimum splicing. Want more information? See your Anaconda Representative or write *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

*Reg. U. S. Pat. Off. 54387

Durasheath neoprene jacketed cable

ANACONDA®

of new or existing plants and can also be used for by-product recovery.

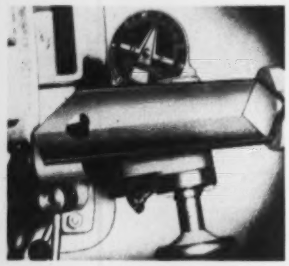
The simplest type of Impingo Filter is a two-cell, parallel-flow system. Design is flexible, so that a number of cells may filter and so that a series of cells may contain more than one size or kind of granule, each to serve a specific purpose. Mechanical Industries Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 19

Clearance Angle Gage

. . . drill sharpening aid

A gage for accurately setting the clearance angle when sharpening drills consists of a dial graduated for drill sizes from $\frac{1}{8}$ inch



to $2\frac{1}{2}$ inches. The clearance angle indicator, which shows 8 degrees, 10 degrees and 12 degrees of clearance, is moved by means of a handwheel.

The desired clearance angle is lined up with the size of the drill being ground. More or less clearance than is shown on the indicator can be accurately estimated if necessary. McDonough Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 20

Rust Inhibiting Paint

. . . rust resistance, plus gloss

A rust-inhibiting paint formula, combining rust resistance with glossy enamel-like finish, has been perfected by Glidden. The Nev-A-Rust line may be applied by brush or reduced with mineral spirits for spraying.

The formula blends alkyd resins with rust inhibitive pigments and linseed oil to achieve its characteristics. Designed for field and shop coatings on structural steel, the paint offers similar protection to any metal surface subjected to oxidation and corrosion. It is unaffected by temperature change. Glidden Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 21

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 147 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Stainless Welding Electrode

A. O. Smith Corp.—Welding Products Division offers a 24-page manual covering in detail the metallurgy of stainless steels. It provides an A. O. Smith stainless steel electrode selector table and offers other valuable tabular material on welding processes as related to varying chemical composition involved with types of stainless.

FOR A FREE COPY CIRCLE REPLY CARD NO. 22

Arbor Presses

Greenerd Arbor Press Co.—Catalog No. 54 fully describes the Greenerd line of standard hydraulic presses. Each type covered is accompanied by a photograph and a list of physical dimensions. Catalog 41 gives the same description for their hand operated arbor presses in the full range from $\frac{1}{4}$ to 20 tons pressure.

FOR A FREE COPY CIRCLE REPLY CARD NO. 23

Shovels

Thew Shovel Co.—A 12-page catalog illustrates and describes the Thew 42 series. Among features highlighted are roller-bearing mounted hoist drums, swing drums and front turntable rollers. A section each is devoted to the Moto-Shovel, Moto-Hoe, Moto-Clamshell and Moto-Dragline, with another section giving special emphasis to the crane boom and its equipment.

FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Spindle Bearings

Cincinnati Milling Machine Co.—Cincinnati's self-adjusting construction and perpetual youth record of Filmatic spindle bearings are presented in their new catalog. Complete details and factual evidence of the advantages offered by this type of construction are covered. Its 12 pages are amply illustrated.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

Precision Grinders

Landis Tool Co.—A bulletin describes Landis' two models of precision centerless grinders. It describes the machines, points up special operating features, lists standard equipment and specifications.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Motor Pulleys

Reeves Pulley Co.—Complete redesign of the standard line of Reeves Vari-Speed motor pulleys is described in a 28-page catalog. The catalog offers complete description and construction details, lubrication, controls available and instructions on how to select the proper unit.

FOR A FREE COPY CIRCLE REPLY CARD NO. 27

Power Generation

General Electric Co. — Power generation and conversion in steel mills is the subject of Bulletin GER-892. The 8-page bulletin provides an analysis of steel mill power generating equipment and a discussion of various power sources.

FOR A FREE COPY CIRCLE REPLY CARD NO. 28

Chucking Reamers

Niles-Bement-Pond Co. — Pratt & Whitney Division offers a 6-page brochure covering their chucking reamers. Fraction sizes, letter sizes and wire gage sizes are given for both straight shank and taper shank reamers.

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Press Brakes

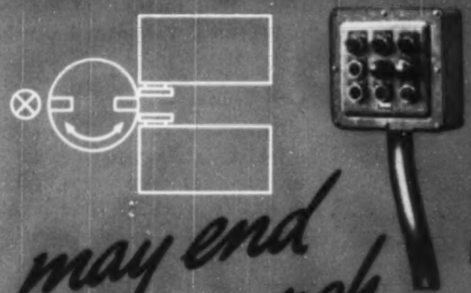
Niagara Machine & Tool Works—Comprehensive and informative bulletin 89-C introduces the com-

Fifty Years
1904 • 1954

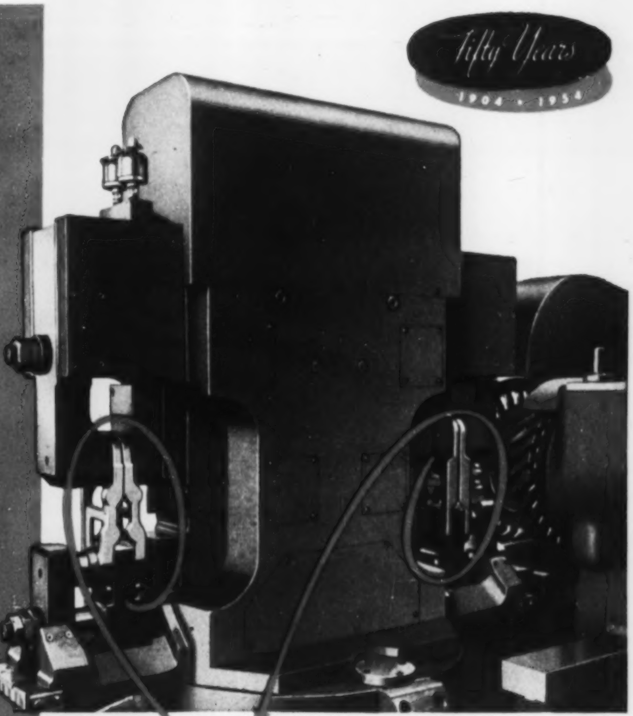
Duplex Milling

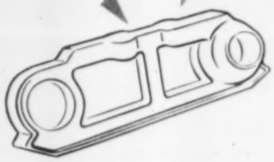
as Engineered by

MOTCH & MERRYWEATHER



may end your search

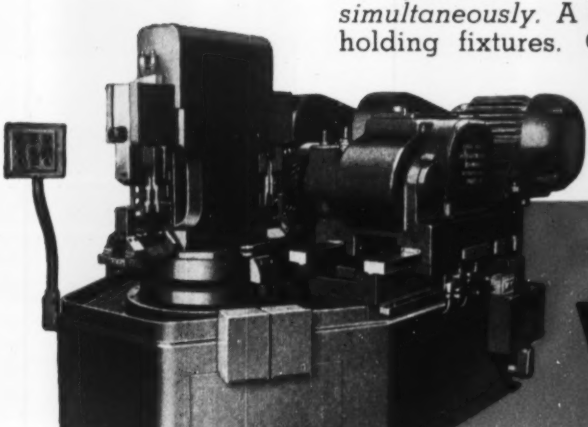




Both sides of tractor side bars are face milled. Production is 240 pieces per hour using high speed steel cutters.

PRODUCTION CAN BE RAISED 50%
by Motch & Merryweather's *Duplex Milling Method!*

• Production milling is given new meaning by Motch & Merryweather's duplex method. Two heads mill two parts *simultaneously.* A table indexing 180° has two sets of work-holding fixtures. One operator unloads and loads during *duplex milling* at the opposite fixture. Fully automatic operation sets new production limits. Consult Motch & Merryweather about your production milling.



THE
MOTCH & MERRYWEATHER
MACHINERY CO.
MACHINERY MANUFACTURING DIVISION
CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

E. W. FERRY SCREW P
INC
MEMO

WE'RE RIGHT "NEXT DOOR" IN TERMS OF SERVICE!

. . . and when you want stainless steel screws or high-tensile alloy fasteners . . . standard or special . . . try FERRY service. You would expect the "world's leading manufacturer of stainless steel screws" to have an edge in quality and service; WE HAVE.

The E. W. FERRY SCREW PRODUCTS Inc.
Smith Road, Brookpark, Cleveland 30, Ohio

plete new line of Niagara press brakes. Described and illustrated are their double end twin drive, rigid frame construction, box type crown, sealed oil baths for gearing and electro pneumatic clutch.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Industrial Gas Trucks

Yale & Towne Mfg. Co.—Materials Handling Division offers an 8-page brochure describing and picturing the new G-52 series gasoline fork lift trucks. Fluid coupling is described in detail. Cutaway photos and diagrams illustrate other features of the trucks, plus typical Yale attachments.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Lift Trucks

Towmotor Corp.—This company offers a catalog showing why failure to put Towmotor fork lift trucks to work in your plant will cost many times their purchase price. In-use photos show how their trucks saved money in moving many different materials.

FOR A FREE COPY CIRCLE REPLY CARD NO. 32

Piping

A. M. Byers Co.—Industrial plants are among the examples used to illustrate "Piping for Permanence," a 32-page bulletin. Helpful technical data based on an analysis of thousands of piping systems in which wrought iron is specified to help solve corrosion problems is given. Sections of the publication are devoted to a roundup of wrought iron pipe installations, piping properties and service records.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

Electric Furnace Control

Whiting Corp. — A complete presentation of the new techniques and cost-reducing advantages of the Hydro-Arc electric furnace control are given in bulletin FO-10. It describes major developments in arc furnace controls and shows how they differ fundamentally from previous types.

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Insight Into Bohn

Bohn Aluminum & Brass Corp. —Highlights of the Bohn operation are depicted with clarity by the company's offer of "Insight into Bohn." A new 26-page publication shows the products they make and how they are made by

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NEW PRODUCT INFORMATION

INFORMATION ON ADVERTISED PRODUCTS

FREE EDITORIAL CLIP SHEETS

picturing what is essential in each division and relating it to the whole operation. The report shows the Bohn technique in research, metallurgical and production control, sand casting, permanent mold casting, extrusion, forging and fabrication of refrigeration products.

FOR A FREE COPY CIRCLE REPLY CARD NO. 35

Air Control Valves

Ross Operating Valve Co.—Three fundamental types of air control valves are described and illustrated in their 12-page bulletin. Also explained are primary advantages of air power, including speed, cleanliness, economy, resiliency and lightness. Colored diagrammatic drawings show how the air flows through valves and to the operated cylinders.

FOR A FREE COPY CIRCLE REPLY CARD NO. 36

Roll Forming Equipment

American Roller Die Corp.—32 pages, plastic bound, are devoted to basic engineering data, including helpful specification line drawings and latest equipment photographs on Ardcor roll forming equipment. Among the subjects covered: Ardcor roll forming machines, tube mills, forming rolls, pipe and tubing rolls.

FOR A FREE COPY CIRCLE REPLY CARD NO. 37

Welding, Cutting Equipment

K-G Equipment Co. Inc.— A 20-page catalog covers their complete line of welding and cutting equipment. A brief description of their products' specifications and illustrations are included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 38

Metal Powder Story

Easton Metal Powder Co. Inc.—Easton describes its modern plant in a new well-illustrated 4-page bulletin. The company, manufacturers of a new iron powder line made by its RZ process, employs a picture story to depict sequence of production operations and laboratory facilities.

FOR A FREE COPY CIRCLE REPLY CARD NO. 39

Welding Transformer

Sciaky Bros. Inc.—Bulletin No. 328-10 covers Sciaky's new unit welding transformer, a small compact unit for portable, multiple point, package unit and indirect series welding applications. Its advantages and construction features are described and specifications listed.

FOR A FREE COPY CIRCLE REPLY CARD NO. 40

Hydrogen and Steel

C. Tennant Sons & Co.—"The Significance of Hydrogen in Steel Manufacture" in the latest issue of the "Murex Review" published in England is intended to give a clearer understanding of the effects of hydrogen in steel. It indicates means which may be useful in exercising proper controls.

FOR A FREE COPY CIRCLE REPLY CARD NO. 41

Vacuum Furnaces

F. J. Stokes Machine Co.—Applications of vacuum furnaces in melting and casting several new metals, as well as in sintering, annealing, hardening, brazing and degassing are described in "High Vacuum Furnaces, Their Use and Application." It discusses at length the rapidly growing field of vacuum metallurgy and includes a comprehensive treatment of the effects of processing various metals and alloys in vacuum.

FOR A FREE COPY CIRCLE REPLY CARD NO. 42

Materials Handling

Republic Steel Corp.—A 20-page catalog describes the princi-

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6	16	26	36	46	56	66	76	86
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pal products of Republic's Pressed Steel Division, including steel boxes, skids, pallets, foundry flasks and stampings. Each product described is clearly illustrated.

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Maintenance Procedure

Oakite Products Inc.—How-to do-it charts based on actual in-plant mantenance procedures are a feature of the "Plant Maintenance Cleaning Guide." Designed for quick reference, the charts list recommended cleaning materials, methods of applications, concentrations and temperatures for several specfic operations.

FOR A FREE COPY CIRCLE REPLY CARD NO. 44

Lab Construction

Allis-Chalmers Mfg. Co.—Factors to be taken into consideration in planning and constructing a betatron industrial radiography laboratory are discussed in an 8-page bulletin. The bulletin describes and portrays features of the A-C betatron lab which was placed in operation in 1952.

FOR A FREE COPY CIRCLE REPLY CARD NO. 45

Steel Shelving

Precision Equipment Co.—New catalog covers items added to Precision's standard line, consisting of steel shelving, lockers, ladders and other storage and maintenance equipment for industrial and institutional use. Each item is clearly illustrated and priced.

FOR A FREE COPY CIRCLE REPLY CARD NO. 46

Twist Drills

United Drill & Tool Corp.—The Whitman & Barnes Division's "Twist Drill Applications" gives recommendations as to kind of drill to use in practically all types of metals and materials. The chart illustrates six types of jobber drills. Illustrations also show correct drill point angles to use, proper speeds, feeds and recommended oils and cutting compounds.

FOR A FREE COPY CIRCLE REPLY CARD NO. 47

Cleaning Abrasive

American Wheelabrator & Equipment Corp.—A bulletin covers their steel shot, a cast-steel, heat-treated, blast cleaning and peening abrasive. The 8 pages discuss automatic process and quality control exercised in the company's new manufacturing facilities. Tabular comparison shows characteristics of metallic abrasive types.

FOR A FREE COPY CIRCLE REPLY CARD NO. 48

EDITORIAL REPRINTS:

Distribution

A great opportunity to cut costs and expand sales lies in distribution. Up to half the retail price of many metalworking products results from distribution charges. One of the major problems in distribution is personnel—the salesmen, warehousemen, advertising people, freight forwarders who move your product from the point of manufacture to the point of sale. The sixth report in STEEL's Program for Management on page 91, shows how you can better utilize your distribution personnel.

FOR A FREE COPY CIRCLE REPLY CARD NO. 49

Super Steel

U. S. Steel is showing off the properties of Carilloy T-1, its new, super tough, quenched and tempered steel. On page 102 you'll find that they have used it for four large T-1 pressure tanks. Its use may be extended to any application requiring a structural steel of high strength, toughness and weldability that can be gas-cut and cold-formed.

FOR A FREE COPY CIRCLE REPLY CARD NO. 50

Coated Electrodes

Heavily-coated electrodes containing large quantities of powdered iron in their coatings are achieving increased welding speeds on the order of 50 per cent, says the article on page 104. A year's application indicates the iron powder types are living up to advance billing.

FOR A FREE COPY CIRCLE REPLY CARD NO. 51

Carbides in Stainless

Part I of a two-part series starts on page 106. It discusses the fact that type 310 stainless steel, a desirable heat and corrosion-resistant alloy, has good ductility and weldability, but that it also has peculiarities that must be recognized.

FOR A FREE COPY CIRCLE REPLY CARD NO. 52

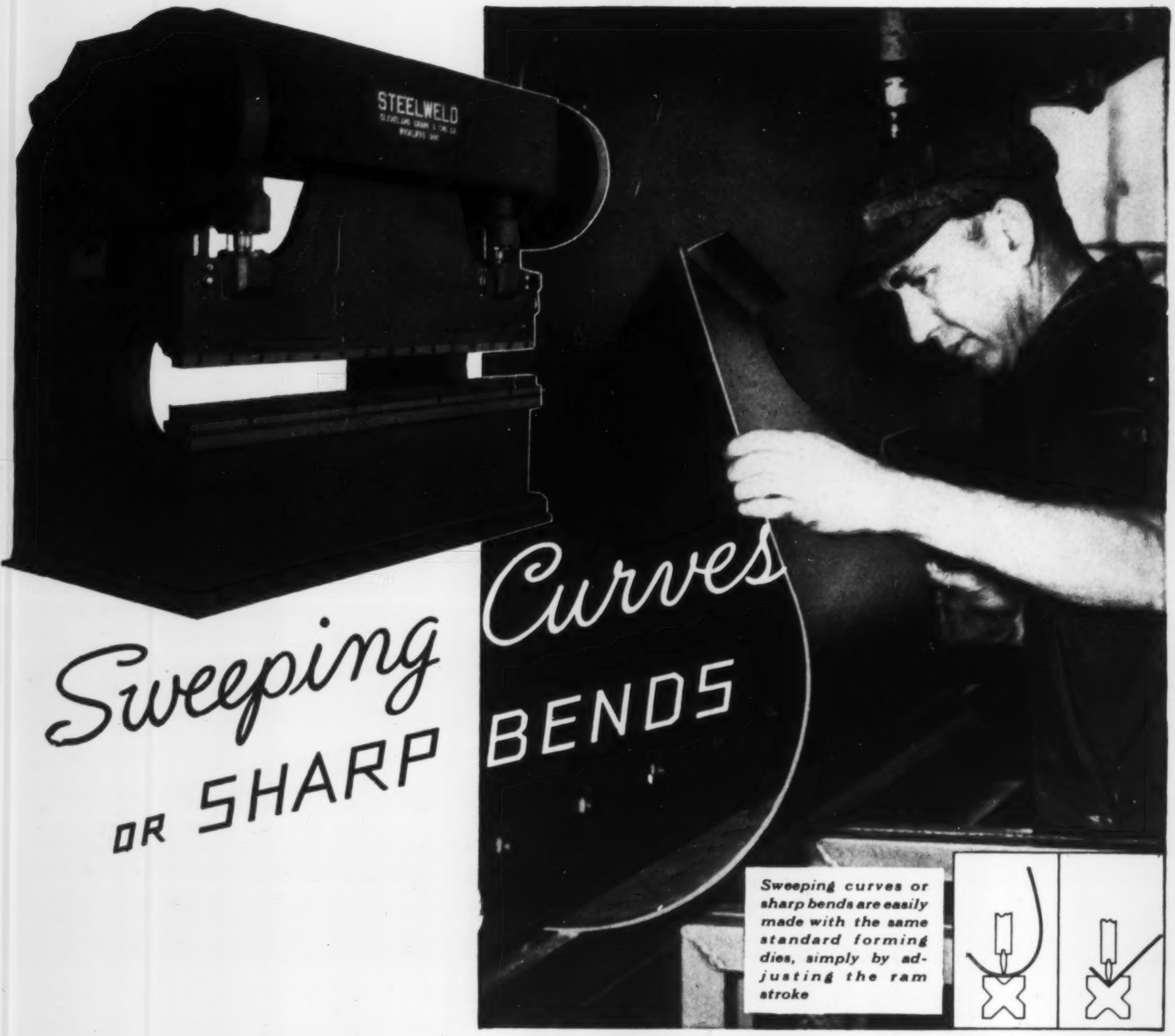
STAINLESS STEEL FOR BUILDINGS

McLouth
STAINLESS
Steel

High quality stainless sheet
and strip steel . . . for the product
you make today and the
product you plan for tomorrow.

McLOUTH STEEL CORPORATION
DETROIT, MICHIGAN
Manufacturers of Stainless and Carbon Steels

Sweeping Curves OR SHARP BENDS



Sweeping curves or sharp bends are easily made with the same standard forming dies, simply by adjusting the ram stroke

For decades plate has been sharply bent — or curved — corrugated — punched — and formed into various shapes. But can you think of any ONE method or machine prior to the development of the bending press, that could perform all of these operations speedily and easily?

In this modern world where efficiency is becoming ever more important, no one working with plate in thickness up to an inch can afford to be without a bending press. As applied to metal forming, it is a lathe, a shaper, a planer, a boring mill and drill press, all rolled up into one.

Sweeping curves and sharp bends are only a few of the many operations that can be performed on a Steelweld. With dies available, and simple ones that are easily made, the kinds of work that can be produced are practically limitless.

Now, more than ever before, it is important that you be keyed up to do all kinds of forming work with dispatch and accuracy. We urge you to get the facts on this modern tool.

GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
7802 EAST 281ST STREET, WICKLIFFE, OHIO

STEELWELD
BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

STEEL

July 19, 1954

Market Outlook

BASIC SOUNDNESS of business is reflected in the rebound of steel production after the Fourth of July holiday. Ingot output regained 5.5 points in the first full work week of July, the week ended July 18. That recovery was made despite vacations in the steelmaking and steel consuming plants.

In recovering 5.5 points, the ingot rate reached 65 per cent of capacity.

LIKE OLD TIMES— No one expected July to be a strong production month for steel. Many people think August will be slow, too. It's not surprising that the two summer vacation months may be limp, for the seasonal factor has returned to business. Before the war days, slow business in the summer was expected.

ACCEPTED— Another proof that business is sound is the smoothness with which the steel price increases were put into effect as a means of passing along part of the wage increase given the steelworkers. Steel prices have remained remarkably stable ever since steel demand started declining a year ago. Holding particularly firm have been base prices. What concessions have been made have been largely in the form of freight absorption by producers.

Some people look upon the maintenance of price stability in the steel industry as a reason why business as a whole has not gone into a tailspin. Price cutting, they say, would not generate any additional demand for steel. It merely would have weakened confidence and demoralized business as a whole, they declare. A quarter-cent cut per pound in the price of steel going into an automobile would lower the cost of the car only about $9, hardly enough to touch off a buying spree.

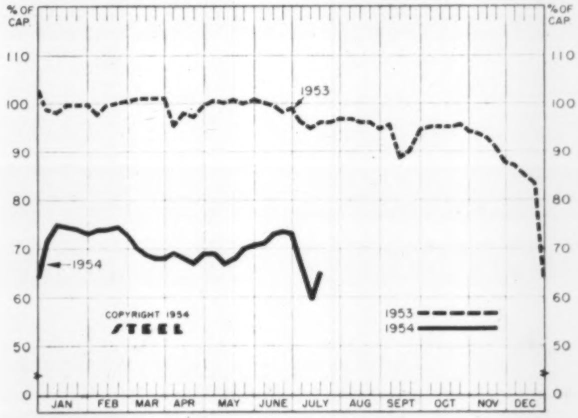
With seasonal factors back into vogue, it's reasonable to expect an upturn in steel demand as the summer fades away. The automobile industry will be launching into production of its new models and will be ordering steel actively. Some steel sellers already report a gain in orders specifying September and October delivery of cold-rolled sheets.

YARDSTICKS— If steel production can equal the pace of the auto industry from here on, steelmaking in the last half of this year will exceed that of the first half when ingot output totaled 44,128,998 net tons, 24 per cent below the 57,945,936 tons turned out in the first half of last year. Meanwhile, production in the automobile industry, user of one-fifth of all the steel made in the U. S., was down only 10 per cent. This shows that many steel users were living off their inventories.

VARIATIONS— In some areas, steel demand is stronger than in others. Demand for the various forms of finished steel vary too. This staggered adjustment to a business decline is helping soften the impact of the adjustment. Typical of the contrasts is the demand for plate. On the eastern seaboard, plates continue to move the most slowly of all major tonnage steel products. In the Los Angeles area, sellers of plates are rapidly filling August order books.

PRICES RISE— Reflecting announcement of price increases by additional steelmakers, STEEL's price composite on finished steel advanced to $114.91 a net ton, a rise of 75 cents.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended July 18	Change	Same Week 1953	Same Week 1952
Pittsburgh	64.5	+ 6*	96	8
Chicago	73	+ 2.5*	98.5	5
Mid-Atlantic	59	+ 4	97.5	17
Youngstown	70	+ 10	105	6
Wheeling	75	+ 9	98	50.5
Cleveland	67.5	+ 11*	101.5	0
Buffalo	59	— 2	106.5	0
Birmingham	75	— 1	101	0.5
New England	48	0	45	18
Cincinnati	49.5	—12.5	98	33
St. Louis	55.5	0	95.5	88
Detroit	53.5	+ 3.5	108	49
Western	79	— 7	100	33
National Rate	65	+ 5.5	96	15

INGOT PRODUCTION‡

	Week Ended July 18	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	97.1†	89	107.4	132.8
NET TONS (In thousands)	1,559†	1,430	1,725	2,134

---

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended July 13

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.420
Rails, light, 40 lb	5.817
Tie Plates	5.175
Axles, railway	7.333
Wheels, freight car, 33 in. (per wheel)	47.000
Plates, carbon	4.592
Structural Shapes	4.417
Bars, tool steel, carbon (lb)	0.415
Bars, tool steel, alloy, oil hardening die (lb)	0.505
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.075
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.550
Bars, H.R., alloy	$8.625
Bars, H.R., stainless, 303 (lb)	0.418
Bars, H.R., carbon	4.923
Bars, reinforcing	4.945
Bars, C.F., carbon	7.974
Bars, C.F., alloy	10.975
Bars, C.F., stainless, 302 (lb)	0.433
Sheets, H.R., carbon	4.780
Sheets, C.R., carbon	5.721
Sheets, galvanized	7.000
Sheets, C.R., stainless, 302 (lb)	0.548
Sheets, electrical	9.000
Strip, C.R., carbon	7.271
Strip, C.R., stainless, 430 (lb)	$0.415
Strip, H.R., carbon	4.994
Pipe, black, buttweld (100 ft)	14.563
Pipe, galv., buttweld (100 ft)	17.841
Pipe line (100 ft)	143.627
Casing, oil well, carbon (100 ft)	150.691
Casing, oil well, alloy (100 ft)	216.15
Tubes, boiler (100 ft)	‡
Tubing, mechanical, carbon	‡
Tubing, mechanical, stainless, 304 (100 ft)	161.193
Tin plate, hot-dipped, 1.25 lb	$8.433
Tin plate, electrolytic, 0.25 lb	7.133
Black plate, can making quality	6.233
Wire, drawn, carbon	7.769
Wire, drawn, stainless, 430 (lb)	0.545
Bale ties (bundle)	5.653
Nails, wire, 8d common	7.570
Wire, barbed (80-rod spool)	6.917
Woven wire fence (20-rod roll)	16.335

‡ Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	July 13 1954	July 6 1954	Month Ago	June Average
(1947-1949=100)	141.7	141.7	140.9	140.9

STEEL's FINISHED STEEL PRICE INDEX*

	July 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.15†	192.47†	189.75	189.18	152.90
Index in cents per lb	5.260†	5.214†	5.140	5.125	4.142

STEEL's ARITHMETICAL PRICE COMPOSITES

	July 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT*	$114.91†	$114.16†	$113.20	$114.84	$91.82
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.07
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	27.67	27.33	27.83	43.17	19.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

†Preliminary

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	July 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.45	4.45	4.15	4.15	3.35
Bars, H.R., Chicago	4.45	4.15-4.45	4.15	4.15	3.35
Bars, H.R., del. Philadelphia	4.55	4.55	4.405	5.302	3.816
Bars, C.F., Pittsburgh	5.40	5.40	5.20	5.20	3.95
Shapes, Std., Pittsburgh	4.25	4.25	4.10	4.10	3.25
Shapes, Std., Chicago	4.25	4.10-4.25	4.10	4.10	3.25
Shapes, del., Philadelphia	4.53	4.53	4.38	4.38	3.492
Plates, Pittsburgh	4.225	4.225	4.10	4.10	3.40
Plates, Chicago	4.225	4.10-4.225	4.10	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.10	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.10	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.10	4.55	3.50
Sheets, H.R., Pittsburgh	4.10	4.10	3.925	3.925	3.25
Sheets, H.R., Chicago	4.10	3.925-4.10	3.925	3.925	3.25
Sheets, C.R., Pittsburgh	5.00	5.00	4.775	4.775	4.00
Sheets, C.R., Chicago	5.00	4.775-5.00	4.775	4.775	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.275	5.275	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.975-4.425	3.25
Strip, H.R., Chicago	4.05	3.925-4.05	3.925	3.925	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45	5.45-5.95	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.70	4.00
Strip, C.R., Detroit	5.65	5.65	5.65	5.45-6.05	4.20
Wire, Basic, Pitts.	5.75	5.75	5.525	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.85	6.85	6.55	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75

SEMIFINISHED STEEL

	July 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Billets, forging, Pitts. (NT)	$78.00	$78.00	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	4.675	4.675	4.525	4.525	3.775

PIG IRON, Gross Ton

	July 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.39
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	60.16	60.16	60.16	61.25	49.89
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	60.43	45.43
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

	July 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
No. 1 Heavy Melt, Pitts.	$28.50	$28.50	$29.50	$44.50	$21.00
No. 1 Heavy Melt, E. Pa.	24.00	23.00	23.00	43.50	18.00
No. 1 Heavy Melt, Chicago	30.50	30.50	32.00	41.50	19.50
No. 1 Heavy Melt, Valley	26.50	27.50	29.50	45.50	18.50
No. 1 Heavy Melt, Cleve.	24.50	25.50	28.50	44.50	15.00
No. 1 Heavy Melt, Buffalo	25.50	25.50	26.50	40.75	19.75
Rails, Rerolling, Chicago	42.50	42.50	44.50	54.00	27.75
No. 1 Cast, Chicago	36.00	36.00	38.50	41.00	27.50

COKE, Net Ton

	July 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.00	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 13, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 27.00-27.50 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.125 del. Midwest; Lake 30.00 del; Fire refined 29.75 del.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 13.80, chemical 13.90, corroding 13.90, St. Louis; N.Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks, 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N.J.

Mercury: Open market, spot, New York, $270-$275, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices

DAILY NONFERROUS PRICE RECORD

	Price July 13	Last Change	Previous Price	June Avg.	May Avg.	July 1953 Avg.
Copper	30.00	Apr. 12	29.75–30.00	30.000	30.000	29.846
Lead	13.80	June 15	14.05	13.906	13.800	13.483
Zinc	11.00	June 3	10.50	10.923	10.290	11.000
Tin	96.50	July 14	96.50	94.178	93.600	81.577
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	21.50	July 15, 1953	20.50	21.500	21.500	20.923
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes. 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, del.; Magnesium 99.8%, Freeport, Tex.

f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium. $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 96.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.) $4.72; grade A-2 (0.5% Fe max.) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb, f.o.b. shipping point; less than 1000 lb $5.10; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.00, brass special 11.25, intermediate 11.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.35, special high grade 12.50, die casting alloy ingot 15.00, del.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingots: Piston Alloy 20.00-20.50; No. 12 foundry alloy (No. 2 grade) 19.25-19.75; 5% silicon alloy, 0.60 Cu max., 22.25-22.50; 13 alloy, 0.60 Cu max., 22.25-22.50; 195 alloy 21.00-21.50; 108 alloy 19.75-20.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 20.00-20.50; grade 2, 19.00-19.50; grade 3, 18.00-18.50; grade 4, 17.00-17.50.

Brass Ingot: Red brass, No. 115, 27.00; tin bronze No. 225, 39.00; No. 245, 33.25; high-leaded tin bronze, No. 305, 31.50; No. 1 yellow, No. 405, 23.25; manganese bronze No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 27.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire del., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $19.00 per cwt; pipe, full coils $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R. ..	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ...	84.5	66.5	90.5
Rod, Shapes ...	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks ..	...	60.0	...

ALUMINUM

(30,000 lb base; freight allowed over 499 lb) Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

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* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	—Round— 11S-T3	—Round— 17S-T4	—Hexagonal— 11S-T3	—Hexagonal— 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares. Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20.000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in., 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.82	48.92	18.250	18.000	17.500
Commercial Bronze, 90%....	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5% ...	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

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a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clippings 13.00; low copper clippings 13.00; mixed clippings 11.00; old sheet 10.00; borings and turnings 6.00; pistons and struts 7.50; crankcases 10.00; industrial castings 10.00.

Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.50; light copper 21.00-21.50; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 11.50-12.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 11.50-12.00; heavy yellow brass 14.00; new brass rod ends 16.00; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 16.50-17.00.

Lead: Heavy 11.00-11.25; battery plate 5.75-6.00; linotype and stereotype 13.00; electrotype 11.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 4.75-5.00; new die cast scrap, 4.50-4.75; old die cast scrap, 3.00-3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 14.75-15.25; 51S, 52S clippings 14.75-15.25; 14S, 17S, 24S clippings 14.00-14.50; mixed clippings 13.00-13.50; old sheet 12.00-12.50; old cast 12.00-12.50; clean old cable, free of steel 14.50-15.00; borings and turnings 12.50-13.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier not less than 1.5% Be, 42.00; light scrap 37.00.

Copper Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; refinery brass (60% copper) per dry copper content 22.75-23.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; No. 1 composition borings 20.50; No. 1 composition solids 21.50; heavy yellow brass solids 16.50; yellow brass turnings 16.00; radiators 17.50-17.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,0000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.125; 200-499 lb $1.11; 500-999 lb $1.105; 1000 lb or more $1.10.

Zinc: Bar 18.50, bar or flat top 17.50 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 71.5; 100-600 lb 57.2; 700-1900 lb 54.7; 2000-9900 lb 53; 10,000 lb or more 51.9.

Stannous Chloride: (Anhydrous): Less than 50 lb $1.576; 50 lb $1.236; 100-300 lb $1.086; 400-900 lb $1.061; 100-1900 lb $1.037; 2000-4900 lb $1; 5000-19,000 lb 93.9; 20,000 lb and over 87.8.

Stannous Sulphate: Less than 5 lb $1.275; 50 lb 97.5; 100-1900 lb 95.5; 2000 lb and over 93.5.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Nonferrous Metals

Tin prices expected to be stable for some time at current levels as result of International Tin Agreement. It needs only official ratification to become effective

WITH ONLY official ratification of the International Tin Agreement pending, reasonable stability in tin prices is probable for some time. Broadly, stability at around present levels is an aim of the agreement, and the consuming and producing countries now participating appear to present enough strength to make it effective—barring military or political upheavals in the Far East worse than now anticipated. Even the United States, which did not enter the pact, has given the arrangement its blessing.

Influenced from U. S.—Contributing also to a certain balance, the United States government again is committed to a policy of stockpiling, following a period of uncertainty as to whether it would continue to pile tin. It will take in this year about 20,000 gross tons of Indonesian production and also 12,000 gross tons of Bolivian concentrates for the Texas City smelter, which may continue operation for at least another year following much talk of closing down.

Thus a substantial part of last year's surplus of tin production over consumption, estimated at as high as 48,000 to 50,000 gross tons, will be taken up, with strength likely to be imparted for some time by accumulation of Straits for the creation of buffer stocks under the tin agreement.

Counterbalance—On the debit side, tin consumption in this country, by far the largest user, was off in the first quarter with probability that it may have been off in the second quarter, although in lesser degree. Consumption of primary metal in the first 3-month period, as estimated by the U. S. Bureau of Mines, was 17,860 gross tons, against 19,604 in the corresponding period last year, a drop of about 9 per cent. Tin and terne plate took 10,656 gross tons, compared with 11,897; solder, the second largest outlet, 2870, against 4307. Over-all consumption for that period, including secondary metal, amounted to 27,030 gross tons, compared with 29,890.

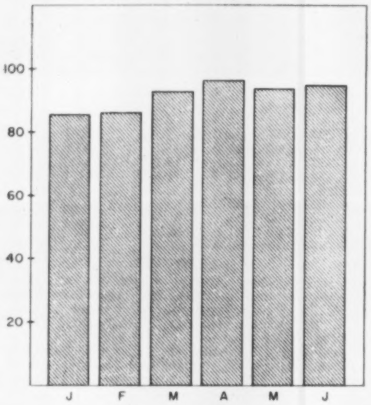
This indicated decline in the first half is not surprising in view of the reduction in metalworking activity. However, there has been no lag in tin plate, which consumes by far the heaviest percentage of primary metal.

Steady—Currently, the spot market is quiet and steady at around 96.50c, New York. A year ago it was dragging at 80.50c, after having reached an early high in 1953 of 121.50c. Little strength, then, was manifested until late fall, when prices started creeping up to around 86c in December under pressure of somewhat increased demand and a more troubled situation in Indo-China. Then followed a leveling off until March, when prices stepped up to 94c only to move on to 97c in April on an average.

PATTERN FOR THE FUTURE?

Tin Price Stability Foreseen

(Straits tin, monthly averages in cents per pound, New York)



Commenting on the March spurt, C. A. Ilgenfritz, United States Steel Corp., pointed out in the National Association of Purchasing Agents' bulletin, that the advance followed the government's announcement that, while it would not become a party to the International Tin Agreement, it would take no steps to discourage interested countries from joining. The adoption of this sympathetic position of "benevolent neutrality," he said, was not generally anticipated. This gave the market a boost.

Well Stocked—Also, so he indicated, buoyancy was imparted by the government's intimation that it would resume stockpiling on expiration of current contracts, and that all stockpiled tin would be held off the market, except as released by Presidential order. The government, he pointed out, already had 300,000 gross tons, or about five years' supply at current rates of consumption. Another strengthening factor, he declared, was continued adversity in Indo-China.

But in May and June, as these factors became more fully discounted, there was an easing, and the market has fluctuated within relatively narrow limits ever since. Spot now is well within the inside Tin Pact range of 93c-$1.03 (New York). Actually, as proposed, there is a double range—£640-720 for buying; £800-880 for selling. This means that the Tin Pact manager can buy at the equivalent of 93c, New York, or, if conditions warrant, as low as 83c; or he can sell at $1.03, New York, or as high as $1.13, if necessary.

Lineup—Participating in the pact are 14 consumer countries and all six producing countries. Former, with voting units indicated, are: United Kingdom (145), France (55), Canada (37), Netherlands (36), India (29), Italy (28), Japan (26), Australia (16), Belgium (14), Turkey (11), Denmark (10), Spain (10), Lebanon (5), and Ecuador (5). Consuming countries which did not sign are United States, West Germany, Switzerland and Brazil. Producing countries, with voting units, are Malaya (360), Indonesia (213), Bolivia (213), Belgian Congo and Ruanda-Urundi (90), Thailand (66) and Nigeria (58).

Nonferrous Briefs

- The Pacific Northwest's first major aluminum extrusion mill began operation late last month at Aluminum Co. of America's Vancouver, Wash., plant. The $3,360,000-mill's equipment includes two 2500-ton hydraulic presses.

- Chase Brass & Copper Co. plans a $5-million program to expand and modernize its sheet mill facilities in Euclid, O. Last month Chase announced a $4-million program to increase its copper and copper alloy tube producing facilities at its other Euclid plant.

- Shipments of zinc to users in June, 1954, were the largest in 13 months, says the American Zinc Institute Inc. June, 1954, shipments were 80,239 tons, compared with 64,566 tons in May, 1954, and the largest since May, 1953, when 84,250 tons were shipped.

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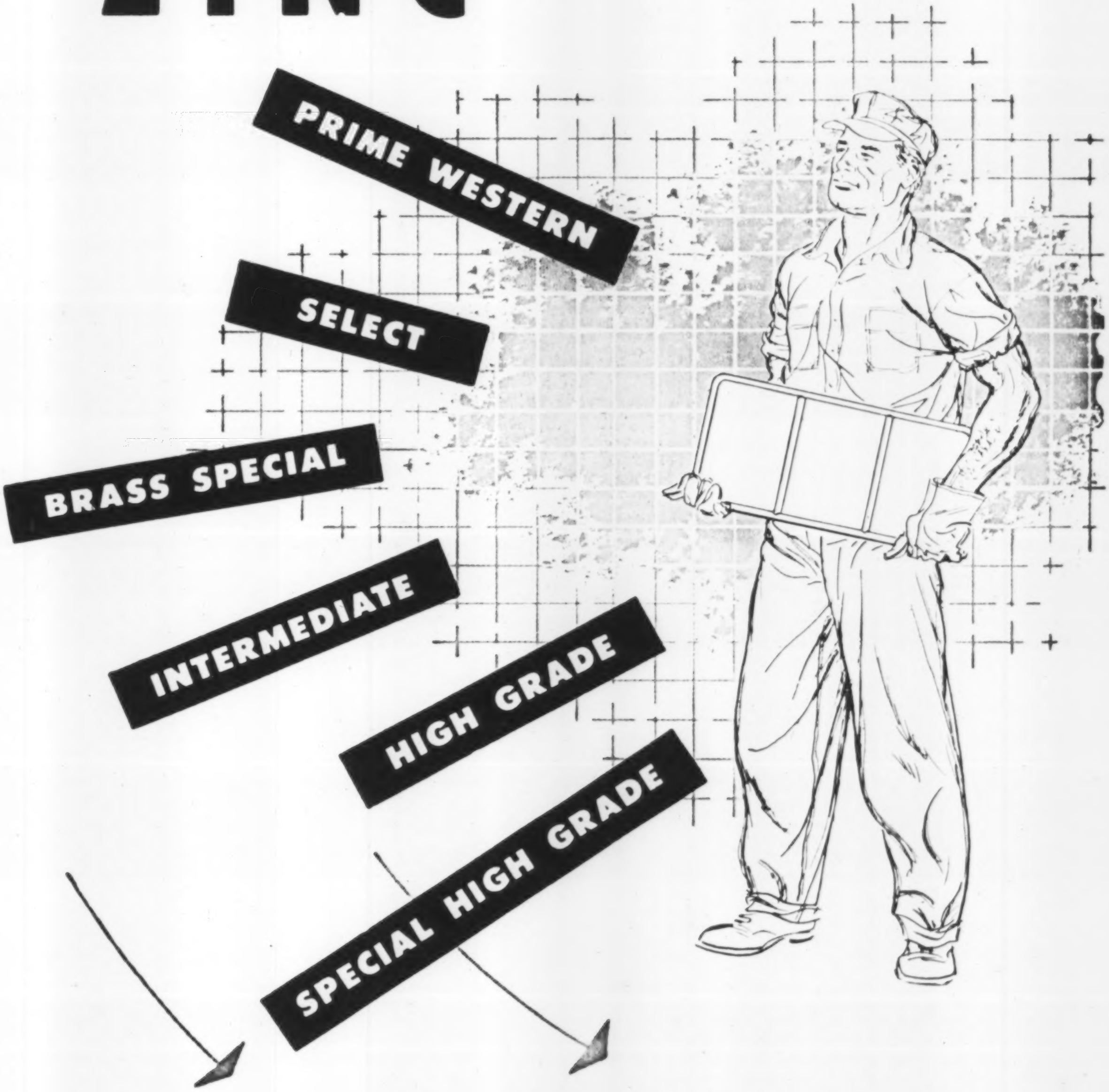
civilian requirements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Columbus, O. Chicago St. Louis New York

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 157. Key to footnotes, page 159.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	*$61.50*

INGOTS, Alloy (NT)

Detroit R7	$63.00
Midland,Pa. C18	62.00
Munhall,Pa. U5	65.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Aliquippa,Pa. J5	*$64.00*
Bessemer,Pa. U5	64.00
Clairton,Pa. U5	64.00
Ensley,Ala. T2	64.00
Fairfield,Ala. T2	64.00
Fontana,Calif. K1	*72.00*
Gary,Ind. U5	64.00
Johnstown,Pa. B2	64.00
Lackawanna,N.Y. B2	64.00
Munhall,Pa. U5	64.00
So.Chicago,Ill. U5	64.00
So.Duquesne,Pa. U5	64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5	*$78.00*
Bessemer,Pa. U5	78.00
Buffalo R2	78.00
Clairton,Pa. U5	78.00
Cleveland R2	78.00
Conshohocken,Pa. A3	83.00
Detroit R7	78.50
Ensley,Ala. T2	78.00
Fairfield,Ala. T2	78.00
Fontana,Calif. K1	*86.00*
Gary,Ind. U5	78.00
Geneva,Utah C11	*78.00*
Houston S5	83.50
Johnstown,Pa. B2	78.00
Lackawanna,N.Y. B2	78.00
LosAngeles B3	85.00
Munhall.Pa. U5	78.00
Seattle B3	89.00
So.Chicago R2,U5,W14	78.00
So.Duquesne,Pa. U5	78.00
So.SanFrancisco B3	*87.50*

Alloy, Forging (NT)

Bethlehem,Pa. B2	*$86.00*
Buffalo R2	86.00
Canton,O. T7	82.00
Canton,O. R2	86.00
Conshohocken,Pa. A3	93.00
Detroit R7	84.00
Fontana,Calif. K1	*105.00*
Gary,Ind. U5	86.00
Houston S5	90.00
Ind.Harbor,Ind. Y1	*86.00*
Johnstown,Pa. B2	86.00
Lackawanna,N.Y. B2	86.00
LosAngeles B3	102.00
Massillon,O. R2	86.00
Midland,Pa. C18	82.00
Munhall,Pa. U5	86.00
So.Chicago R2,U5,W14	86.00
So.Duquesne,Pa. U5	86.00
Struthers,O. Y1	*86.00*
Warren,O. C17	*86.00*

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$96.50
Cleveland R2	96.50
Gary,Ind. U5	96.50
So.Chicago R2, W14	96.50
So.Duquesne,Pa. U5	96.50

SKELP

Aliquippa,Pa. J5	*4.00*
Fontana,Calif. K1	*4.775*
Munhall,Pa. U5	3.90
Warren,O. R2	3.90
Youngstown R2, U5	3.90

WIRE RODS

AlabamaCity,Ala. R2	4.675
Aliquippa,Pa. J5	*4.675*
Alton,Ill. L1	4.70
Buffalo B11, W12	*4.675*
Cleveland A7	4.675
Donora,Pa. A7	4.675
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	*5.475*
Houston S5	4.925
IndianaHarbor,Ind. Y1	*4.675*
Johnstown,Pa. B2	4.675
Joliet,Ill. A7	4.675
KansasCity,Mo. S5	4.865
Kokomo,Ind. C16	4.625
LosAngeles B3	5.325
Minnequa,Colo. C10	4.775
Monessen,Pa. P7	4.525
No.Tonawanda,N.Y.B11	4.525
Pittsburg,Calif. C11	5.325
Portsmouth P12	4.525
Roebling,N.J. R5	4.625
So.Chicago,Ill. R2	4.675
Sterling,Ill.(1) N15	4.675
Struthers,O. Y1	*4.675*
SparrowsPoint,Md. B2	4.775
Torrance,Calif. C11	5.475
Worcester,Mass. A7	4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5	*4.25*
Bessemer,Ala. T2	4.25
Bethlehem,Pa. B2	*4.30*
Birmingham C15	*4.25*
Clairton,Pa. U5	4.25
Fairfield,Ala. T2	4.25
Fontana,Calif. K1	*4.90*
Gadsden,Ala.(31) R2	*4.28*
Gary,Ind. U5	4.25
Geneva,Utah C11	4.25
Houston S5	4.50
Ind.Harbor,Ind. I-2	*4.25*
Johnstown,Pa. B2	4.30
KansasCity,Mo. S5	4.70
Lackawanna,N.Y. B2	4.30
LosAngeles B3	4.80
Minnequa,Colo. C10	4.55
Munhall,Pa. U5	4.25
Niles,Calif. P1	4.80
Phoenixville,Pa. P4	3.80
Seattle B3	*5.00*
So.Chicago U5, W14	4.25
So.SanFrancisco B3	*4.90*
Torrance,Calif. C11	4.95
Weirton,W.Va. W6	4.25

Wide Flange

Bethlehem,Pa. B2	4.30
Clairton,Pa. U5	4.25
Fontana,Calif. K1	*5.25*
Lackawanna,N.Y. B2	4.30
Munhall,Pa. U5	4.25
Phoenixville,Pa. P4	3.80
So.Chicago,Ill. U5	4.25

Alloy Stand. Shapes

Clairton,Pa. U5	5.20
Fontana,Calif. K1	*6.60*
Gary,Ind. U5	5.20
Munhall,Pa. U5	5.20
So.Chicago,Ill. U5	5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5	*6.40*
Bessemer,Ala. T2	6.40
Bethlehem,Pa. B2	6.45
Clairton,Pa. U5	6.40
Fairfield,Ala. T2	6.40
Fontana,Calif. K1	*7.05*
Gary,Ind. U5	6.40
Geneva,Utah C11	6.40
Ind.Harbor,Ind. I-2, Y1	*6.40*
Johnstown,Pa. B2	6.45
Lackawanna,N.Y. B2	6.45
LosAngeles B3	6.85
Munhall.Pa. U5	6.40
Seattle B3	*7.15*
So.Chicago,Ill. U5, W14	6.40
So.SanFrancisco B3	*7.05*
Struthers,O. Y1	*6.40*

H.S., L. A. Wide Flange

Bethlehem,Pa. B2	6.45
Lackawanna,N.Y. B2	6.45
Munhall,Pa. U5	6.40
So.Chicago.Ill. U5	6.40

PILING

Bearing Piles

Munhall,Pa. U5	4.25
So.Chicago,Ill. U5	4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	*5.075*
Lackawanna,N.Y. B2	5.075
Munhall,Pa. U5	5.075
So.Chicago.Ill. U5	5.075

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2	4.255
Aliquippa.Pa. J5	*4.225*
Ashland,Ky.(15) A10	*4.225*
Bessemer,Ala. T2	4.225
Buffalo(31) R2	4.13
Clairton,Pa. U5	4.225
Claymont,Del. C22	4.225
Chicago(31) R2	4.17
Cleveland J5	*4.225*
Cleveland(31) R2	4.285
Coatesville,Pa L7	4.225
Conshohocken,Pa. A3	4.225
Ecorse,Mich. G5	4.375
Fairfield,Ala. T2	4.225
Fontana,Calif.(30) K1	*4.875*
Gadsden,Ala.(31) R2	4.13
Gary,Ind. U5	4.225
Geneva,Utah C11	4.225
GraniteCity,Ill. G4	*4.425*
Harrisburg,Pa. C5	3.85
Houston S5	4.50
Ind.Harbor,Ind. I-2, Y1	*4.225*
Johnstown,Pa. B2	4.225
Lackawanna,N.Y. B2	4.225
LoneStar,Tex. L6	4.40
Mansfield,O. E6	*4.225*
Minnequa,Colo. C10	4.95
Munhall,Pa. U5	4.225
Newport,Ky. N9	*4.225*
Pittsburgh J5	*4.225*
Riverdale,Ill. A1	4.225
Seattle B3	*5.125*
Sharon,Pa. S3	*4.225*
So.Chicago,Ill. U5,W14	4.225
SparrowsPoint,Md. B2	4.225
Steubenville,O. W10	4.10
Warren,O.(31) R2	4.625
Weirton,W.Va. W6	4.225
Youngstown Y1	*4.225*
Youngstown(31) R2	4.275
Youngstown U5	4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1	*6.025*
Geneva,Utah C11	5.375

PLATES, Wrought Iron

Economy,Pa. B14	*9.80*

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	*6.45*
Bessemer.Ala. T2	6.45
Clairton,Pa. U5	6.45
Cleveland J5, R2	*6.45*
Conshohocken,Pa. A3	6.45
Ecorse,Mich. G5	6.60
Fairfield,Ala. T2	6.45
Fontana,Calif.(30) K1	*7.15*
Gary,Ind. U5	6.45
Geneva,Utah C11	6.45
Ind.Harbor,Ind. I-2, Y1	*6.45*
Johnstown,Pa. B2	6.45
Lackawanna,N.Y. B2	6.45
Munhall.Pa. U5	6.45
Pittsburgh J5	*6.45*
Seattle B3	7.15
Sharon,Pa. S3	*6.45*
So.Chicago,Ill. U5, W14	6.45
SparrowsPoint,Md. B2	6.45
Warren,O. R2	*6.45*
Youngstown U5	6.45
Youngstown Y1	*6.45*

PLATES, Alloy

Claymont,Del. C22	5.80
Coatesville,Pa. L7	5.80
Fontana,Calif. K1	*6.85*
Gary,Ind. U5	5.80
Johnstown,Pa. B2	5.80
Munhall.Pa. U5	5.80
Newport,Ky. N9	*5.80*
Sharon,Pa. S3	*5.80*
So.Chicago.Ill. U5, W14	5.80
SparrowsPoint,Md. B2	5.80

FLOOR PLATES

Cleveland J5	*5.275*
Conshohocken,Pa. A3	5.275
Harrisburg,Pa. C5	5.15
Ind.Harbor,Ind. I-2	*5.275*
Munhall,Pa. U5	5.275
So.Chicago,Ill. U5	5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10	*4.475*
Ashland l.c.l. (15) A10	*4.975*
Cleveland c.l. R2	4.70
Warren,O. c.l. R2	4.70

BARS

BARS, Hot-Rolled Carbon

Aliquippa,Pa. J5	*4.30*
Alton,Ill. L1	4.35
Atlanta,Ga. A11	*4.50*
Bessemer,Ala. T2	4.30
Birmingham C15	*4.30*
Buffalo(31) R2	4.33
Canton,O.(31) R2	4.46
Chicago(31) R2	4.37
Clairton,Pa. U5	4.30
Cleveland(31) R2	4.36
Detroit R7	4.30
Ecorse,Mich. G5	4.45
Emeryville,Calif. J7	4.90
Fairfield,Ala. T2	4.30
Fairless.Pa. U5	4.45
Fontana,Calif. K1	*5.00*
Gary,Ind. U5	4.30
Gadsden,Ala.(31) R2	4.33
Houston S5	4.55
Ind.Harbor,Ind. I-2, Y1	*4.30*
Johnstown,Pa. B2	4.30
KansasCity,Mo. S5	4.75
Lackawanna,N.Y. B2	4.30
LosAngeles B3	4.85
Massillon,O.(31) R2	4.46
Milton,Pa. M18	4.15
Minnequa,Colo. C10	4.60
Niles,Calif. P1	4.85
N.Tonawanda,N.Y. B11	*4.30*
Pittsburg,Calif. C11	5.00
Pittsburgh J5	*4.30*
Portland,Oreg. O4	*5.05*
Seattle B3, N14, P23	*5.05*
So.Chicago U5, W14	4.30
So.Duquesne,Pa. U5	*4.30*
So.SanFran.,Calif. B3	*5.05*
Sterling,Ill.(1) N15	4.30
Struthers,O. Y1	*4.30*
Torrance,Calif. C11	5.00
Warren,O. R2	*4.34*
Weirton,W.Va. W6	4.30
Youngstown U5	4.30
Youngstown(31) R2	4.35

Bars, Hot-Rolled Alloy

Bethlehem,Pa. B2	5.075
Buffalo R2	5.105
Canton,O. T7	4.875
Canton,O. R2	5.115
Chicago R2	5.145
Clairton,Pa. U5	5.075
Detroit R7	4.975
Ecorse,Mich. G5	5.225
Fontana,Calif. K1	*6.125*
Fairless,Pa. U5	5.225
Gary,Ind. U5	5.075
Houston S5	5.275
Ind.Harbor,Ind. I-2, Y1	*5.075*
Johnstown,Pa. B2	5.075
KansasCity,Mo. S5	5.475
Lackawanna,N.Y. B2	5.075
LosAngeles B3	5.925
Massillon,O. R2	5.115
Midland,Pa. C18	4.875
So.Chicago U5, W14	5.075
So.Duquesne,Pa. U5	5.075
Struthers,O. Y1	*5.075*
Warren,O. C17	*5.075*
Warren R2	4.34
Youngstown U5	5.075
Youngstown R2	4.35

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	*6.45*
Bessemer,Ala. T2	6.45
Bethlehem,Pa. B2	6.45
Clairton,Pa. U5	6.45
Cleveland R2	*6.45*
Ecorse,Mich. G5	6.60
Fairfield,Ala. T2	6.45
Fontana,Calif. K1	*7.70*
Gary,Ind. U5	6.45
Ind.Harb.,Ind. I-2, Y1	*6.45*
Johnstown,Pa. B2	6.45
Lackawanna,N.Y. B2	6.45
LosAngeles B3	6.925
Pittsburgh J5	*6.45*
Seattle B3	6.975
So.Chicago W14	6.45
So.Duquesne,Pa. U5	6.45
So.SanFrancisco B3	6.975
Struthers,O. Y1	*6.45*
Youngstown U5	6.45

BAR SIZE ANGLES; H.R.CARBON

Bethlehem,Pa. B2	4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	*4:30*
Atlanta A11	*4.50*
Fontana,Calif. K1	*5.00*
Niles,Calif. P1	4.85
SanFrancisco S7	5.10

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	5.20
Gary,Ind. U5	5.20
Houston S5	5.60
KansasCity S5	5.60
Youngstown U5	5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	*5.40*
BeaverFalls,Pa. M12	*5.40*
BeaverFalls,Pa. R2	5.46
Buffalo B5	5.45
Camden,N.J. P13	*5.85*
Carnegie,Pa. C12	*5.40*
Chicago W18	*5.40*
Cleveland C20	*5.40*
Cleveland A7	5.40
Detroit P17, R7	5.35
Detroit B5	5.60
Donora,Pa. A7	5.40
Elyria,O. W8	5.20
FranklinPark,Ill. N5	5.40
Gary,Ind. R2	5.47
GreenBay,Wis. F7	*5.40*
Hammond.Ind. L2, M13	5.40
Hartford.Conn. R2	5.90
Harvey,Ill. B5	5.40
LosAngeles R2	6.85
LosAngeles S30	6.65
Mansfield,Mass. B5	5.95
Massillon,O. R8	5.20
Massillon,O. R2	5.44
Monaca,Pa. S17	*5.40*
Newark,N.J. W18	*5.85*
NewCastle,Pa.(17) B4	*5.40*
Pittsburgh J5	*5.40*
Plymouth,Mich. P5	5.45
Putnam,Conn. W18	*5.95*
Readville,Mass. C14	*5.95*
St.Louis,Mo. M5	5.50
So.Chicago.Ill. W14	5.40
SpringCity,Pa. K3	*5.85*
Struthers,O. Y1	*5.40*
Waukegan,Ill. A7	5.40
Worcester,Mass. W19	6.10
Youngstown F3, Y1	*5.40*

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19	4.45

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	*6.625*
BeaverFalls,Pa. M12	*6.625*
Buffalo B5	6.625
Camden,N.J. P13	*6.80*
Canton,O. T7	6.325
BeaverFalls,Pa. R2	*6.685*
Bethlehem,Pa. B2	6.325
Carnegie,Pa. C12	*6.625*
Chicago W18	6.325
Cleveland A7, C20	*6.625*
Detroit R7	6.425
Detroit P17	6.475
Detroit B5	6.825
Donora,Pa. A7	6.325
Elyria,O. W8	6.325
Gary,Ind. R2	*6.695*
Hammond,Ind. L2, M13	6.625
Hartford,Conn. R2	*6.925*
Harvey,Ill. B5	6.625
Lackawanna,N.Y. B2	6.325
Mansfield,Mass. B5	7.075
Massillon,O. R8	6.325
Massillon,O. R2	*6.665*
Midland.Pa. C18	6.325
Monaca,Pa. S17	*6.625*
Newark,N.J. W18	*6.80*
Plymouth,Mich. P5	6.525
So.Chicago,Ill. R2	6.325
So.Chicago W14	6.625
SpringCity,Pa. K3	*6.80*
Struthers,O. Y1	*6.625*
Warren,O. C17	*6.625*
Waukegan,Ill. A7	6.325
Worcester,Mass. A7	*6.925*
Youngstown F3, Y1	*6.625*

BARS, Reinforcing (fabricators)

AlabamaCity,Ala. R2	4.33
Atlanta A11	*4.50*
Birmingham C15	*4.30*
Buffalo(31) R2	4.33
Chicago(31) R2	4.37
Cleveland(31) R2	4.36
Emeryville,Calif. J7	4.90
Fairfield.Ala. T2	4.30
Fairless.Pa. U5	4.45
Fontana,Calif. K1	*5.00*
Gadsden,Ala.(31) R2	4.18
Gary,Ind. U5	4.30
Houston S5	4.55
Ind.Harbor,Ind. I-2, Y1	*4.30*
Johnstown,Pa. B2	4.30
KansasCity,Mo. S5	4.75
Lackawanna,N.Y. B2	4.30
LosAngeles B3	4.85
Milton,Pa. M18	4.15
Minnequa.Colo. C10	4.75
Niles,Calif. P1	4.85
Pittsburg,Calif. C11	5.00
Pittsburgh J5	*4.30*
SandSprings,Okla. S5	5.00
Seattle B3, N14, P23	*5.05*
So.Duquesne,Pa. U5	4.30
So.SanFrancisco B3	*5.05*
SparrowsPoint,Md. B2	4.30
Sterling,Ill.(1) N15	4.30
Struthers,O. Y1	*4.30*
Torrance,Calif. C11	5.00
Youngstown U5	4.30
Youngstown(31) R2	4.35

BARS, Reinforcing (Fabricated; to consumers)

Johnstown, ¼-1" B2	5.55
KansasCity S5	6.35
LosAngeles B3	5.80
Marion,O. P11	5.55
Seattle N14	5.80
Seattle B3, P23	5.85
So.SanFrancisco B3	5.85
SparrowsPt. ½-1" B2	5.55
Williamsport,Pa. S19	*5.60*

RAIL STEEL BARS

Avis Pa.(3) J8	4.25
ChicagoHts.(3) C2, I-2	*4.20*
ChicagoHts.(4) C2, I-2	*4.30*
Ft. Worth,Tex.(26) T4	4.65
Franklin,Pa.(3) F5	4.05
Franklin,Pa.(4) F5	4.15
Marion,O(3) P11	4.15
Moline,Ill.(3) R2	4.15
Tonawanda(3,4) B12	4.15
Williamsport,Pa.(3) S19	*4.30*

BARS, Wrought Iron

Economy,Pa.(S.R.) B14	*10.85*
Economy,Pa.(D.R.) B14	*13.50*
Economy(Staybolt) B14	*13.80*
McK.Rks.(S.R.) L5	*10.85*
McK.Rks.(D.R.) L5	*14.75*
McK.Rks.(Staybolt) L5	*16.25*

SHEETS

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2	4.05
Allenport Pa. P7	3.925
Ashland,Ky.(8) A10	*4.05*
Cleveland J5	*4.05*
Cleveland R2	4.05
Conshohocken,Pa. A3	4.10
Detroit M1	4.075
Ecorse,Mich. G5	4.20
Fairfield,Ala. T2	4.05
Fairless,Pa. U5	4.10
Fontana,Calif. K1	*4.825*
Gary,Ind. U5	4.05
Geneva,Utah C11	4.15
GraniteCity,Ill. G4	*4.25*
Ind.Harbor,Ind. I-2, Y1	*4.05*
Irvin,Pa. U5	*4.05*

Kokomo,Ind. C16	4.025
Lackawanna,N.Y. B2	4.05
Mansfield,O. E6 (37)	*4.05*
Mansfield,O. E6 (38)	*4.80*
Munhall,Pa. U5	4.05
Newport,Ky N9	*4.05*
Niles,O. N12	*4.05*
Pittsburg,Calif. C11	4.75
Pittsburgh J5	*4.05*
Portsmouth,O. P12	3.925
Riverdale,Ill. A1	4.05
Sharon,Pa. S3	*4.05*
So.Chicago,Ill. W14	4.05
SparrowsPoint,Md. B2	4.05
Steubenville,O. W10	3.925
Warren,O. R2	4.05
Weirton,W.Va. W6	4.05
Youngstown U5, Y1	*4.05*

SHEETS, H.R. (19 ga. lighter)

AlabamaCity,Ala. R2	5.35
Kokomo,Ind. C16	5.025
Niles,O. N12	*4.95*

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5	*6.10*
Cleveland R2	6.10
Conshohocken,Pa. A3	6.15
Ecorse,Mich. G5	6.25
Fairfield,Ala. T2	6.10
Fairless,Pa. U5	6.15
Fontana,Calif. K1	*6.875*
Gary,Ind. U5	6.10
Ind.Harbor,Ind. I-2, Y1	*6.10*
Irvin,Pa. U5	6.10
Lackawanna(35) B2	6.10
Munhall,Pa. U5	6.10
Pittsburgh J5	*6.10*
Sharon,Pa. S3	*6.10*
So.Chicago,Ill. U5	6.10
SparrowsPoint(36) B2	6.10
Warren,O. R2	6.10
Weirton,W.Va. W6	6.10
Youngstown U5	6.10
Youngstown Y1	*6.10*

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10	*4.30*
Cleveland R2	*4.65*
Cleveland J5	4.775
Ind.Harbor,Ind. I-2	*4.30*
Warren,O. R2	*4.65*

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7	4.775
Cleveland R2	4.95
Cleveland J5	*4.95*
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	4.95
Fairless,Pa. U5	5.00
Follansbee,W.Va. F4	*4.95*
Fontana,Calif. K1	*6.05*
Gary,Ind. U5	4.95
GraniteCity,Ill. G4	*5.15*
Ind.Harbor,Ind. I-2, Y1	*4.95*
Irvin,Pa. U5	4.95
Lackawanna,N.Y. B2	4.95
Middletown,O. A10	*4.95*
Pittsburg,Calif. C11	5.90
Pittsburgh J5	*4.95*
Portsmouth,O. P12	4.775
SparrowsPoint,Md. B2	4.95
Steubenville,O. W10	4.775
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown Y1	*4.95*

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland R2	7.50
Cleveland J5	*7.50*
Ecorse,Mich. G5	7.65
Fairless,Pa. U5	7.55
Fontana,Calif. K1	*8.55*
Gary,Ind. U5	7.50
IndianaHarbor,Ind. Y1	*7.50*
Irvin,Pa. U5	7.50
Lackawanna(37) B2	7.50
Pittsburgh J5	*7.50*
SparrowsPoint(38) B2	7.50
Warren,O. R2	7.50
Weirton,W.Va. W6	7.50
Youngstown Y1	*7.50*

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	*5.55*
Middletown,O. A10	*5.45*
Warren,O. R2	*5.55*

SHEETS, Culvert

	Cu Alloy	Cu Fe
Ashland,Ky. A10	*6.50*	
Canton,O. R2	*6.50*	*7.10*
Fairfield T2	*6.25*	*6.50*
Gary,Ind. U5	*6.25*	*6.50*
Ind.Harbor I-2	*6.25*	*6.50*
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind. C16	6.175	....
MartinsFry.,O.W10	6.075	...
Newport,Ky. N9	*6.25*	*6.50*
Pitts.,Calif. C11	*7.00*	....
SparrowsPt. B2	6.25	....

SHEETS, Culvert Pure Iron

Ashland,Ky. A10	*6.75*
Fairfield,Ala. T2	*6.50*
MartinsFerry,O. W10	6.325

SHEETS, Galvanized Steel Hot-dipped

AlabamaCity,Ala. R2	5.45‡
Ashland,Ky. A10	*5.45**
Butler,Pa. A10	*5.45†*
Canton,O. R2	5.45‡
Dover,O. R1	*5.45‡*
Fairfield,Ala. T2	5.45*
Gary,Ind. U5	5.45*
GraniteCity,Ill. G4	*5.65‡*
Ind.Harbor,Ind. I-2	*5.45†*
Irvin,Pa. U5	5.45†
Kokomo,Ind. C16	5.375‡
MartinsFerry,O. W10	5.275*
Middletown,O. A10	*5.45†*
Newport,Ky. N9	*5.45‡*
Niles,O. N12	*5.45‡*
Pittsburg,Calif. C11	6.20*
SparrowsPt.,Md. B2	5.45‡
Steubenville,O. W10	5.275‡
Weirton,W.Va. W6	5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5	8.20
SparrowsPoint(39) B2	8.20

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10	*5.70*
Canton,O. R2	6.20

SHEETS, Galvannealed Steel

Canton,O. R2	*5.85*
Irvin,Pa. U5	*6.00*
Kokomo,Ind. C16	5.925
Newport,Ky. N9	*6.00*
Niles,O. N12	*6.00*

SHEETS, Galvanized Ingot Iron (Hot-dipped continuous)

Ashland,Ky. A10	*5.70*
Butler,Pa. A10	*5.70*
Middletown,O. A10	*5.70*

SHEETS, Electrogalvanized

Cleveland R2 (28)	*6.15*
Niles,O. R2 (28)	*6.15*
Weirton,W.Va. W6	5.975

SHEETS, Aluminum Coated

Butler,Pa. A10	8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	*5.375*
Cleveland R2	5.375
Gary,Ind. U5	5.375
GraniteCity,Ill. G4	*5.575*
Ind.Harbor,Ind. I-2	*5.375*
Irvin,Pa. U5	5.375
Middletown,O. A10	*5.375*
Niles,O. N12	*5.375*
Youngstown Y1	*5.375*

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4	*7.375*
Follansbee(23) F4	*6.60*
Yorkville,O. W10	7.20

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottm,W.Va.W10	5.675
Gary,Ind. U5	5.85
Mansfield,O. E6	*5.85*
Middletown,O. A10	*5.85*
Niles,O. N12	*5.85*
Weirton,W.Va. W6	5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	*6.25*

SHEETS, Well Casing

Fontana,Calif. K1	*6.325*

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.05
Allenport,Pa. P7	3.925
Alton,Ill. L1	4.10
Ashland,Ky.(8) A10	*4.05*
Atlanta A11	*4.25*
Bessemer,Ala. T2	4.05
Birmingham C15	*4.05*
Bridgeport,Conn.(10)S15	*4.05*
Buffalo(27) R2	4.05
Carnegie,Pa. S18	4.425
Conshohocken,Pa. A3	4.175
Detroit M1	4.075
Ecorse,Mich. G5	4.20
Fairfield,Ala. T2	4.05
Fontana,Calif. K1	*4.825*
Gary,Ind. U5	4.05
Houston,Tex. S5	4.325
Ind.Harbor,Ind. I-2, Y1	*4.05*
Johnstown,Pa.(25) B2	4.05
KansasCity,Mo.(9) S5	4.525
Lackw'na,N.Y.(25) B2	4.05
LosAngeles(25) B3	4.675
Milton,Pa. M18	3.925
Minnequa,Colo. C10	5.025
NewBritain(10) S15	*4.05*
N.Tonawanda,N.Y. B11	*4.05*
Pittsburg,Calif. C11	4.80
Portsmouth,O. P12	3.925
Riverdale,Ill. A1	4.05
SanFrancisco S7	5.10
Seattle(25) B3, P23	*5.05*
Seattle N14	*5.05*
Sharon,Pa. S3	*4.05*
So.Chicago,Ill. W14	4.05
So.SanFrancisco(25) B3	*4.80*
SparrowsPoint,Md. B2	4.05
Torrance,Calif. C11	4.80
Warren,O. R2	4.05
Weirton,W.Va. W6	4.05
Youngstown U5	4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15	6.45
Carnegie,Pa. S18	6.40
Fontana,Calif. K1	*8.10*
Gary,Ind. U5	6.70
Houston,Tex. S5	6.80
KansasCity,Mo. S5	7.00
LosAngeles B3	7.60
NewBritn.,Conn.(10)S15	6.45
Newport,Ky. N9	*6.70*
Seattle P23	7.80
Sharon,Pa. S3	*6.70*
So.Chicago W14	6.70
Youngstown U5	6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.15
Conshohocken,Pa. A3	5.95
Ecorse,Mich. G5	6.30
Fairfield,Ala. T2	6.15
Fontana,Calif. K1	*7.25*
Gary,Ind. U5	6.15
Ind.Harbor,Ind. I-2, Y1	*6.15*
Lackawanna,N.Y. B2	6.15
LosAngeles(25) B3	6.70
Seattle(25) B3, P23	6.95
Sharon,Pa. S3	*6.15*
So.SanFrancisco(25) B3	6.70
SparrowsPoint,Md. B2	6.15
Warren,O. R2	6.15
Weirton,W.Va. W6	6.15
Youngstown Y1	*6.15*
Youngstown U5	6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	*4.30*
Warren,O. R2	*4.65*

STRIP, Cold-Rolled Carbon

Anderson,Ind. G5	*5.75*
Baltimore T6	5.60
Bridgeport,Conn.(10)S15	*5.75*
Cleveland J5	*5.75*
Cleveland A7	5.75
Dearborn,Mich. D3	5.90
Detroit D2, M1	5.60
Detroit P20	5.65
Dover,O. G6	*5.75*
Ecorse,Mich. G5	5.90
Follansbee,W.Va. F4	*5.75*
Fontana,Calif. K1	*7.65*
FranklinPark,Ill. T6	5.70
Ind.Harbor,Ind. I-2	*6.00*
Indianapolis C8	5.60
Lackawanna,N.Y. B2	5.75
LosAngeles C1	7.50
Mattapan,Mass. T6	6.10
Middletown,O. A10	*5.75*
NewBedford,Mass. R10	6.00
New Britain(10) S15	*5.75*
NewCastle,Pa. B4, E5	*5.75*
NewHaven,Conn. A7	6.50
NewHaven,Conn. D2	5.90
Pawtucket,R.I. N8	6.10
Pawtucket,R.I. R3	*6.40*
Pittsburgh J5	*5.75*
Riverdale,Ill. A1	5.85
Rome,N.Y.(32) R6	5.45
Sharon,Pa. S3	*5.75*
SparrowsPoint,Md. B2	5.75
Trenton,N J. R5	7.00
Wall'ford,Conn. W2	*6.20*
Warren,O. B9	5.45
Warren,O. R2	5.75
Weirton,W.Va. W6	5.75
Worcester,Mass. A7	6.60
Youngstown Y1	*5.75*
Youngstown C8	5.45

STRIP, Cold-Rolled Alloy Steel

Carnegie,Pa. S18	12.00
Cleveland A7	*12.45*
Dover,O. G6	*12.45*
Fontana,Calif. K1	*14.55*
Harrison,N.J. C18	12.00
Pawtucket,R.I.(11) N8	12.15
Pawtucket,R.I.(12) N8	12.45
Sharon,Pa. S3	*12.90*
Worcester,Mass. A7	*12.75*
Youngstown C8	12.00

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	*8.60*
Cleveland A7	*8.60*
Dearborn,Mich. D3	8.35
Dover,O. G6	*8.60*
Ecorse,Mich. G5	8.75
Lackawanna,N.Y. B2	8.425
Pittsburgh J5	*8.60*
Sharon,Pa. S3	*8.10*
SparrowsPoint,Md. B2	8.425
Warren,O. R2	7.60
Weirton,W.Va. W6	8.60
Youngstown Y1	*8.60*

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	*6.35*

TIGHT COOPERAGE HOOP

Atlanta A11	*4.775*
Riverdale,Ill. A1	4.625
Sharon,Pa. S3	*4.475*
Youngstown U5	*4.475*

Key to Producers

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A5	Alloy Metal Wire Co.
A7	American Steel & Wire
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
A13	American Cladmetals Co.
B1	Babcock & Wilcox Co.
B2	Bethlehem Steel Co.
B3	Beth. Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B8	Braeburn Alloy Steel
B9	Brainard Steel Div., Sharon Steel Corp.
B10	E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11	Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12	Buffalo Steel Div., H. K. Porter Co. Inc.
B14	A. M. Byers Co.
B15	J. Bishop & Co.
C1	Calstrip Steel Corp.
C2	Calumet Steel Div., Borg-Warner Corp.
C4	Carpenter Steel Co.
C5	Central Iron & Steel Div. Barium Steel Corp.
C7	Cleve. Cold Rolling Mills
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia-Geneva Steel
C12	Columbia Steel & Shaft.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft.
C15	Connors Steel Div. H. K. Porter Co. Inc.
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
C22	Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23	Charter Wire Products
C24	G. O. Carlson Inc.
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel
D4	Disston & Sons, Henry
D6	Driver Harris Co.
D7	Dickson Weatherproof Nail Co.
D8	Damascus Tube Co.
D9	Wilbur B. Driver Co.
E1	Eastern Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliott Bros. Steel Co.
E6	Empire Steel Corp.
F2	Firth Sterling Inc.
F3	Fitzsimons Steel Co.
F4	Follansbee Steel Corp.
F5	Franklin Steel Div., Borg-Warner Corp.
F6	Fretz-Moon Tube Co.
F7	Ft. Howard Steel & Wire
F8	Ft. Wayne Metals Inc.
G2	Globe Steel Tubes Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
H7	Helical Tube Co.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div., Borg-Warner Corp.
I-6	Ivins, E., Steel Tube
I-7	Indiana Steel & Wire Co.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
K7	Kenmore Metals Corp.
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Steel Co.
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.
M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Pipe Div., Sawhill Tubular Products
M8	Mid-States Steel & Wire
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
M16	Md. Fine & Special. Wire
M17	Metal Forming Corp.
M18	Milton Steel Prod. Div., Merritt-Chapman & Scott
N1	National-Standard Co.
N2	National Supply Co.
N3	National Tube Div.
N5	Nelsen Steel & Wire Co.
N6	NewEng.HighCarb.Wire
N8	Newman-Crosby Steel
N9	Newport Steel Corp.
N12	Niles Rolling Mill Div.
N14	Nrthwst.Steel Roll. Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
O3	Oliver Iron & Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke & Chem.
P7	Pittsburgh Steel Co.
P11	Pollak Steel Co.
P12	Portsmouth Division Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
P19	Pitts. Rolling Mills
P20	Prod. Steel Strip Corp.
P23	Pacific Steel Rolling
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	RelianceDiv.,EatonMfg.
R9	Rome Mfg. Co.
R10	Rodney Metals Inc.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S4	Sharon Tube Co.
S5	Sheffield Steel Div., Armco Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S12	Spencer Wire Corp.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
S20	Southern States Steel
S23	Superior Tube Co.
S25	Stainless Welded Products
S26	Specialty Wire Co. Inc.
S30	Sierra Drawn Steel Corp.
T2	Tenn. Coal & Iron Div.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Strip Division, Pittsburgh Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div., Am. Rad. & Stan. San.
T13	Tube Methods Inc.
U4	Universal-Cyclops Steel
U5	United States Steel Corp.
U6	U. S. Pipe & Foundry
U7	Ulbrich Stainless Steels
V2	Vanadium-Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	West.Auto.Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
W19	Worcester Pressed Steel
Y1	Youngstown Sheet & Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.60	7.95	8.90	10.85	13.15
Bridgeport,Conn.(10) S15	5.75	8.05	9.00	10.95	13.25
Bristol,Conn. W1	...	...	8.90	10.85	....
Carnegie,Pa S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland,O. C7	...	8.00	8.60	10.55	12.85
Dearborn,Mich. D3	5.90	8.25	9.20	....	....
Detroit D2	5.65	7.85	8.80	10.55	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.70	7.80	8.75	10.70	17.00
Harrison,N.J C18	...	...	8.90	10.85	13.15
Indianapolis C8	...	7.80	8.60	10.55	....
Mattapan,Mass T6	6.10	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	5.75	8.05	9.00	10.95	13.25
NewCastle,Pa. B4	5.75	8.05	9.00	10.95	
NewCastle,Pa. E5	5.75	8.05	9.00	10.95	13.25
NewHaven,Conn. D2	5.90	7.95	8.90	10.85	....
NewYork W3	...	7.95	8.90	10.85	13.15
Pawtucket,R.I.(11) N8	...	7.65	8.60	10.55	12.85
Pawtucket,R.I.(12) N8	6.10	7.95	8.90	10.85	13.15
Riverdale,Ill.(1) A1	5.85	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	10.95	13.25
Trenton,N.J R5	..	7.95	8.90	10.85	13.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.25	13.55
Warren,O. T5	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va. W6	5.85	8.05	9.00	10.95	13.25
Worcester,Mass. A7	6.60	8.35	9.30	11.45	14.15
Worcester,Mass. T6	6.10	7.95	8.90	10.85	13.15
Youngstown C8	...	7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.50	15.00	....
Buffalo W12	...	...	12.50	....	....
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Worcester,Mass. W12	...	...	12.50	....	....
Youngstown C8	...	...	12.85	15.35	18.35

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	8.75	9.75	10.65
Brackenridge,Pa. A4	..	..	8.75	9.75	10.65
IndianaHarbor,Ind. I-2	8.025	8.50	9.10	10.10	
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	
Vandergrift,Pa. U5		8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	
Zanesville,O. A10		8.50	9.10	10.10	11.00

C.R. CUT LENGTHS OR COILS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*		
Vandergrift,Pa. U5		9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.60	12.15	12.65	13.65
Brackenridge,Pa. A4	11.60	....	....	....
Newport,Ky. N9	11.95			
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95	12.50	13.00	14.00

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10			16.60	17.10	
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2					12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va.W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated))	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.75
Aliquippa,Pa. J5	5.75
Alton,Ill. L1	5.70
Atlanta A11	5.95
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.75
Cleveland C20	5.75
Cleveland A7	5.75
Crawfordsville,Ind M8	5.625
Donora,Pa. A7	5.75
Duluth,Minn. A7	5.75
Fairfield,Ala. T2	5.75
Fostoria,O.(24) S1	5.75
Houston S5	5.925
Jacksonville,Fla. M8	6.05
Joliet,Ill. A7	5.75
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.75
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.70
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.75
So.Chicago,Ill. R2	5.75
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.85
Sterling,Ill.(1) N15	5.75
Struthers,O. Y1	5.75
Waukegan,Ill. A7	5.75
Worcester,Mass. A7	6.05

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	7.20
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fostoria,O. S1	6.925
Johnstown,Pa. B2	7.20
LosAngeles B3	7.875
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	7.175
Monessen,Pa. B7	6.925
Monessen,Pa. P16	7.20
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	7.20
So.SanFran. C10	8.15
SparrowsPt.,Md. B2	7.30
Struthers,O. Y1	7.20
Trenton,N.J. A7	7.50
Waukegan,Ill. A7	7.20
Worcester J4	7.225
Worcester T6, W12	7.225
Worcester A7	7.50

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.90
Alton,Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.90
Donora,Pa. A7	6.90
Duluth,Minn. A7	6.90
Johnstown,Pa. B2	6.90
LosAngeles B3	7.575
Minnequa,Colo. C10	6.80
Monessen,Pa. P7	6.625
Monessen,Pa. P16	6.90
NewHaven,Conn. A7	7.20
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.85
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.90
So.SanFrancisco C10	7.85
SparrowsPoint,Md. B2	7.00
Trenton,N.J. A7	7.20
Waukegan,Ill. A7	6.90
Worcester,Mass. A7	7.20

WIRE, Fine & Weaving(8" Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	11.20
Crawfordsville,Ind. M8	10.65
Fostoria,O. S1	10.55
Jacksonville,Fla. M8	11.08
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	10.30
Monessen,Pa. P16	11.20
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	11.55
Waukegan,Ill. A7	11.20
Worcester,Mass. A7	11.50
Worcester,Mass. T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Buffalo W12	9.50
Johnstown,Pa. B2	9.50
Minnequa,Colo. C10	9.625
Monessen,Pa. P16	9.90
Muncie,Ind. I-7	9.70
Portsmouth,O. D2	9.50
Roebling, N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7	9.35
Monessen,Pa. P16	9.75
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.75
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	13.15
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.95
Baltimore T6	7.75
Buffalo W12	7.45
Cleveland A7	7.95
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.95
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P7	7.45
Monessen,Pa. P16	7.95
Pawtkt.,R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester T6, W12	7.75
Worcester A7	8.25

WIRE, Merchant Quality (6 to 8 gage)	An'ld.	Galv.
Ala.City R2	6.90	7.30**
Aliquippa J5	6.90	7.425*
Atlanta A11	7.00	7.55
Bartonville(48)K4	6.775	7.325
Buffalo W12	6.675	7.075†
Cleveland A7	6.90	....
Crawfordsville M8	6.775	7.30
Donora,Pa. A7	6.90	7.30†
Duluth,Minn. A7	6.90	7.30†
Fairfield T2	6.90	7.30†
Houston,Tex. S5	7.075	7.475
Jacksonville,Fla.M8	7.20	7.73
JohnstownB2(48)	6.90	7.45*
Joliet,Ill. A7	6.90	7.30†
KansasCity,Mo.S5	7.275	7.675
Kokomo C16	6.775	7.175†
LosAngeles B3	7.625	....
Minnequa C10	6.925	7.325**
Monessen P7(48)	6.675	7.225
Palmer W12	6.975	7.375†
Pitts.,Calif. C11	7.85	8.25†
Portsmouth,O.P12	6.675	....
Rankin A7	6.90	7.30†
So.Chi'go R2	6.90	7.30**
S.S.Frn.(48)C10	7.85	8.25**
Spar'wsPt.B2(48)	7.00	7.55*
Strl'g(1)(48)N15	6.90	7.45
Struthers,O. Y1	6.90	7.40‡
Worcester A7	7.20	....

* Based on 10c zinc; † 5c zinc; ‡ Less than 10c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga.	Col.
Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	235**
Ala.City, 18 ga. R2	245**
Aliq'ppa,Pa.9-14½ga.J5	149*
Atlanta A11	151
Bartonville,Ill. K4	145
Crawfordsville,Ind. M8	145
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	148
Johnstown,Pa. B2	149
Johnstown 17 ga., 6" B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	146†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142†
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed	Col.
AlabamaCity R2	159**
Aliquippa J5	156*
Atlanta A11	164
Bartonville,Ill. K4	158
Crawfordsville,Ind. M8	158
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	161
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155†
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	162

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE (16 gage)	An'ld. Stone	Galv. Stone
Ala.City R2	12.50	14.05**
Aliquippa J5	12.50	14.30*
Bartonville K4	12.60	14.40
Buffalo W12	12.50	....
Cleveland A7	13.15	
CrawfordsvilleM8	12.50	14.30
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35*
Kokomo C16	12.60	14.15†
Minnequa C10	12.75	14.45**
Palmer,Mas.W12	12.50	14.05†
Pitts.,Calif. C11	13.50	15.05†
SparrowsPt. B2	12.60	14.45*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	...

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	133
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	133
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	136
Monessen,Pa. P7	131
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.00

STAPLES, Polished Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	138
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	135
Crawfordsville,Ind. M8	135
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	135
Minnequa,Colo. C10	138
Monessen,Pa. P7	133
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
So.Chicago,Ill. R2	138
SparrowsPt.,Md. B2	140
Sterling,Ill.(1) N15	138
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2 I-2	145
Duluth,Minn. A7 (49)	150
Franklin,Pa. F5	145
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	150
Moline,Ill. R2	150
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	145
Williamsport,Pa. S19	150

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	13.5	list	17.5	0.25	20	2.75	21.5	4.25	21.5	4.25	20.75	3.5	23.25	6
Ambridge, Pa. N2 (†)	13.5	...	17.5	...	20.0	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3 (*)	13.5	2.25	17.5	3.25	20	5.75	21.5	7.25	21.5	7.25	20.75	6.5	23.25	9
Youngstown Y1 (††)	13.5	+1.5	17.5	0.75	20	3.25	21.5	4.75	21.5	4.75	20.75	4	23.25	6.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

	2 Blk	2 Galv	2½ Blk	2½ Galv	3 Blk	3 Galv	3½ Blk	3½ Galv	4 Blk	4 Galv	5 Blk	5 Galv	6 Blk	6 Galv
Youngstown R2 (**)	13.5	1.5	17.5	0.75	20.0	3.25	21.5	4.75	21.5	4.75	20.75	4.0	23.25	6.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	...	...	...	...	23.75	7.5	26.75	11.5	29.25	15	31.75	16	32.25	17
Alton, Ill. L1 (§)	...	...	...	...	...	...	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
Benwood, W.Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
Butler, Pa. F6‡‡	25	+1.5	17	+6.5	9.5	+12	...	...	...	...	...	...	...	...	...	...
Etna, Pa. N2 (†)	...	...	...	...	...	...	23.75	8.5	26.75	12.5	24.25	16	31.75	16.75	32.25	17.75
Fairless, Pa. N3	...	...	...	...	...	...	19.25	..	22.25	..	24.75	...	27.25	....	27.75	....
Fontana, Calif. K1 (§)	...	...	...	...	...	...	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6
Ind. Harbor Y1 (††)	...	...	...	...	...	...	22.75	7.5	25.75	11.5	28.25	15	30.75	15.75	31.25	16.75
Lorain, O. N3 (*)	...	...	...	...	...	...	23.75	13.5	26.75	17.5	29.25	21	31.75	20.5	32.25	21.5
Sharon, Pa. S4 (‡)	25	+1.5	17	+6.5	9.5	+12	...	.								
Sharon, Pa. M6	...		...		...		23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Sparrows Pt., Md. B2 (§)	23	+3.5	15	+8.5	7.5	+14	31.7	6.5	24.75	10.5	27.25	13	29.75	14	30.25	16
Youngstown R2 (**)	...	...	...	...	...	..	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75
Youngstown Y1 (††)	...	...	...	...	...	..	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Wheatland, Pa. W9(§)	23	+3.5	15	+8.5	7.5	+14	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5(‡)	32.75	17.5	34.25	17.5	34.25	17.5	....	....	....	....
Alton, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	....	..	....	..
Benwood, W.Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Etna, Pa. N2 (†)	32.75	18.25	34.25	19.0	34.25	19.0	25.5	8.75	25.5	8.75
Fairless, Pa. N3	28.25	....	29.75	....	29.75	...	21	....	21	....
Fontana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	...	..	....	...
Ind. Harbor, Ind. Y1 (††)	31.75	17.25	33.25	17	33.25	17	....	....	....	....
Lorain, O. N3 (*)	32.75	22	34.25	20.5	34.25	20.5	....	....	....	....
Sharon, Pa. M6	32.75	18.25	34.25	18	34.25	18	....	....	....	....
Sparrows Pt., Md. B2 (§)	29.75	15.5	32.25	15.5	32.25	15.5	23.5	6.25	23.5	6.25
Youngstown R2 (**)	32.75	18.25	34.25	18	34.25	18.0	25.50	8.75	25.50	8.75
Youngstown Y1 (††)	32.75	18.25	34.25	18	34.25	18	....	....	....	....
Wheatland, Pa. W9 (‡)	32.75	18.25	34.25	18	34.25	18	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), over 9c to 11c inclusive; (††), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment; (‡‡), 11c.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.02	18.44
1¼	13	....	22.53	18.12
1½	13	20.65	24.91	20.01
1¾	13	24.40	29.43	23.66
2	13	27.34	32.98	26.51
2¼	13	30.80	37.15	29.86
2¼	12	33.43	40.32	32.41
2½	12	36.82	44.41	35.70
2¾	12	39.87	48.09	38.66
3	12	42.52	51.28	41.23

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	Std. Tee Rails 60 lb Under
Bessemer, Pa. U5	4.45	4.35	4.40	5.35
Ensley, Ala. T2	4.45	4.35	....	5.35
Fairfield, Ala. T2	....	....	....	5.35
Gary, Ind. U5	4.45	4.35	4.40	....
Huntington, W.Va. W7				*5.35*
IndianaHarbor, Ind. I-2	*4.45*	*4.35*	*4.40*	
Johnstown, Pa. B2	....	....	...(16)	5.20
Lackawanna, N.Y. B2	4.45	4.35	....	5.35
Minnequa, Colo. C10	4.325	4.225	....	5.70
Steelton, Pa. B2	4.45	4.35	....	5.35
Williamsport, Pa. S19				*5.35*

TIE PLATES

Fairfield, Ala. T2	5.275
Gary, Ind. U5	5.275
Ind.Harbor, Ind. I-2	*5.275*
Lackawanna, N.Y. B2	5.275
Minnequa, Colo. C10	5.125
Seattle B3	*5.425*
Steelton, Pa. B2	5.275
Torrance, Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.00
KansasCity, Mo. S5	11.00
Lebanon, Pa. B2	11.00
Minnequa, Colo. C10	11.00
Pittsburgh C3, P14	11.00
Seattle, Wash. B3	11.50

JOINT BARS

Bessemer, Pa. U5	5.425
Fairfield, Ala. T2	5.425
Ind.Harbor, Ind. I-2	*5.425*
Joliet, Ill. U5	5.425
Lackawanna, N.Y. B2	5.425
Minnequa, Colo. C10	5.275
Steelton, Pa. B2	5.425

AXLES

Ind.Harbor, Ind. S13	6.75
Johnstown, Pa. B2	6.75

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.30
Ind.Harbor, Ind. I-2, Y1	*7.30*
KansasCity, Mo. S5	7.30
Lebanon, Pa. B2	7.30
Minnequa, Colo. C10	7.05
Pittsburgh J5	*7.30*
Seattle B3	*7.80*
So.Chicago, Ill. R2	7.30
Struthers, O. Y1	*7.30*
Youngstown R2	7.30

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger	*9.25*
7/16-in. under	List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers	List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	4
9/16-in. & ⅝-in.	5
¾-in. and larger	3
Longer than 6 in.:	
All diameters	+4
Lag bolts, all diams.:	
6 in. and shorter	12
Over 6 in. long	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoe	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	58
H.P., Hex, regular & heavy:	
⅝" and smaller	58
¾" to 1⅛", inclusive	60
1¼" to 1½", inclusive	62
1⅝" and larger	58
C.P. Hex regular & heavy:	
All sizes	58
Hot Galv. Nuts (all types):	
⅝" to 1½", inclusive	40
⅞" to 1½", inclusive	43
Finished Hex Nuts:	
New standard, all sizes	58
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5—10
Plated finishes	30—10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge Iron:	
98+% Fe, annealed	18.00
Unannealed	
Minus 100 mesh	14.50
Minus 35 mesh	10.25
Minus 20 mesh	10.00
Swedish, c.i.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	11.25
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Atomized, 500 lb drums, frgt. allowed:	
Carlots	32.00
Ton lots	34.00
Antimony, 500 lb lots	32.00*
Brass, ¼-ton lots	28.75-37.50†
Bronze, ¼-ton lots	31.00-39.00†
Copper:	
Electrolytic	13.50*
Reduced	13.50*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	89.50
Nickel-Silver, ¼-ton lots	45.75§
Nickel-Silver, ¼-ton lots	48.50**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, ¼-ton lots	18.25-32.00‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

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(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.58c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c for H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6-7 gage.
(49) T-post; deduct 2 cols for U-post.

STAINLESS STEEL MILL PRICES

(Representative prices cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B ..	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L ..	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S ..	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.50	59.00	62.75	62.75
316L ..	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F ..	....	16.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	33.75	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludium Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co., Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates — Carbon Base 10%	Plates — Carbon Base 20%	Sheets — Carbon Base 20%	Sheets — Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	....	....
321	29.80	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	....	....
410	22.90	30.10	....	....
430	22.90	30.10	....	....
Inconel ..	41.23	54.18	....	165.00
Nickel ...	37.50	50.90	....	....
Monel ...	38.90	51.60	....	....
Copper* ..	....	....	46.00	....

	Strip, Carbon Base — Cold Rolled 10%	Cold Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper* ..	27.85	35.85	24.00	32.25

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* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; Copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	*0.26*	*5% Cr Hot Work* ...	*0.405*
Extra Carbon	*0.31*	*W-Cr Hot Work*	*0.43*
Special Carbon	*0.37*	V-Cr Hot Work	0.43
Oil Hardening	*0.405*	*Hi-Carbon-Cr*	*0.73*

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	*4.25*	*1.6*	*12.25*	...	*4.03*
18.25	*4.25*	*1*	*4.75*	...	*2.245*
18	*4*	*2*	*9*	...	*2.615*
18	*4*	*2*	....	...	*1.705*
18	*4*	*1*	....	...	*1.54*
13.75	*3.75*	*2*	*5*	...	*2.185*
13.5	*4*	*3*	....	...	*1.805*
9	*3.5*		....	...	*1.115*
6.4	*4.5*	*1.9*	....	*5*	*1.045*
6	*4*	*3*	....	*6*	*1.29*
2	*1.4*	*1.2*	....	...	*51.50*
1.5	*4*	*1*	....	*8.5*	*0.90*

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON
Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve........	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.67	58.37
McKeesRocks, del.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, del.	57.66	58.16	58.16	58.66
Verona,Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	*60.50*	*61.00*	*61.50*	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T2	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

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* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$87.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	95.00
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, del.	64.00
Troy,N.Y. R2	64.00

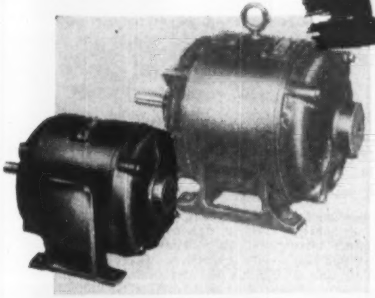
NEW Century Performance-Rated°

INTEGRAL H.P. MOTORS

Now available in 1 . . . 1½ . . . 2 H.P. sizes— NEMA frames 182 and 184.

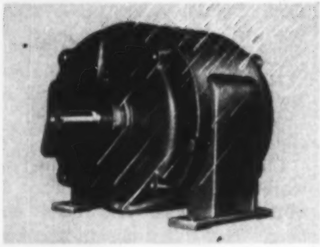
Improved Motors

to match your needs



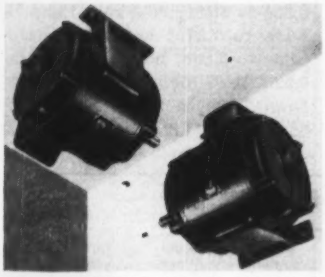
SMALLER — LIGHTER

More uniform silicon-laminated steel; thinner, *tougher* "Mylar" slot insulation — just two of the many technical developments that help make these new Century Performance Rated Motors so much *smaller* and *lighter*.



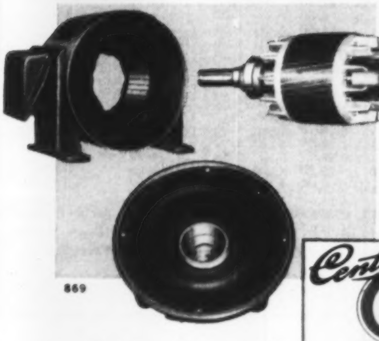
BETTER PROTECTION

New concepts of internal motor ventilation permit end bracket and frame design that gives far better protection from falling liquids and solids . . . still maintain 40°C. temperature rise.



MORE FLEXIBLE MOUNTING

You can even have cushion mounting with these new Century Integral H.P. Motors — your choice of sleeve or ball bearings. Ball bearing motors mount vertically, upside down, in any position. End brackets can be rotated for top protection in any position.



EVEN MORE DEPENDABILITY

Improved plastic impregnating varnish and plastic insulated magnet wire provide unusual resistance to abrasion, moisture and heat. These new materials possess far better dielectric qualities. Die cast aluminum rotors are individually, dynamically balanced to assure freedom from vibration.

869

Century C Motors

Specify CENTURY Performance Rated motors for your equipment. Call a Century District Sales Office or your nearest Century Authorized Distributor.

Offices and Stock Points in Principal Cities

CENTURY ELECTRIC COMPANY • 1806 Pine Street • St. Louis 3, Missouri

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Birmingham, Cincinnati, Erie, St. Paul, 15 cents; Boston, 10 cents; Seattle and Spokane, Wash., no change.)

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Baltimore	6.22	7.51	7.78	....	6.89	...	6.88	8.17[6]	12.04	6.92	6.57	7.96
Birmingham ...	6.35	7.35	8.25[2]	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.18	8.18	9.47	44.78[9]	7.42	...	7.15	8.55	12.13	7.44	7.32	8.26
Buffalo	6.40	7.45	8.84	....	6.50	...	6.55	7.90	12.20	6.77	6.70	7.80
Carnegie,Pa. ..	6.38	...	8.30	....	6.72	...	6.51	7.85	....	6.69	6.52	7.64
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.12	8.30	43.55	6.62	...	6.51	7.50	11.90	6.69	6.52	7.46
Cincinnati	6.48	7.37	8.30	43.80§§	6.86	...	7.75	7.85	12.20	6.91	6.86	7.71
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.80	12.15	7.16	6.81	7.89
Detroit	6.57	7.57	8.58	....	6.90	7.36	6.79	7.79	11.97	7.16	6.80	7.80
Erie, Pa.	6.15	...	8.25	....	6.45	...	6.28	7.25[4]	....	6.46	6.33	7.46
Houston	7.15	7.60	9.23	....	7.45	9.30	7.45	9.30	....	7.35	7.20	8.55
Los Angeles ...	7.25	9.00	8.85	50.15	7.55	11.20	7.15	9.10	12.90	7.35	7.20	9.25
Milwaukee	6.47	7.47	8.21	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.63
Moline, Ill.	6.53	7.47	8.30	....	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	7.28	8.08	8.37	44.15	7.66	...	7.60	8.63[6]	12.18	7.43	7.48	8.78
Norfolk, Va. ..	6.90	...	...	....	7.00	...	7.00	8.50	....	7.00	6.49	7.51
Philadelphia ...	6.19‡‡	7.13	7.87	41.98[9]	6.96‡‡	8.80	6.74	8.19[6]	11.74	6.54‡‡	6.30‡‡	7.34‡‡
Pittsburgh	6.38	7.38	8.30	43.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64**
Portland, Oreg..	7.60	8.45	9.05	....	7.65	...	7.35	10.65	....	7.25	7.25	9.15
Richmond, Va..	6.43	7.39	8.67	....	6.77	...	6.71	8.08	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.54	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.86
St. Paul	6.84	7.78	8.61	....	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco..	7.55	8.95	9.35	48.15	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.15	9.40[7]	9.80	....	7.60	...	7.60	10.55[8]	14.10	7.25	7.35	9.40
Washington ...	6.71	7.65	8.35	....	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed. ‡‡City delivery charge is 10 cents. §§plus $2 for crating. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston where base is 10,000 lb. [2]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ½ in.; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

Distributors Revise Prices Upward

Advance varies among districts as well as products, reflecting sluggish demand and keen competition for business. Part of lag is attributed to users' vacation shutdowns

Philadelphia — Reflecting higher mill prices, local warehouse quotations have been advanced. On base quantities of 2000 to 9999 pounds, f.o.b. warehouse, distributors are now quoting hot-rolled sheets 6.19c; hot-rolled strip 6.96c; hot-rolled bars 6.74c; standard shapes 6.54c; carbon plates 6.49c; and floor plates, heavier gages, 7.51c.

New York — District warehouse prices have stiffened following a period of sharp competition and a subsequent increase in mill prices. On the basis of 2000 to 9999 pounds, f.o.b. warehouse, hot-rolled sheets are now 7.28c; cold-rolled sheets 8.08c; hot-rolled strip 7.66c; hot-rolled bars 7.60c; shapes 7.43c; carbon plates 7.47c and floor plates 8.78c.

Pittsburgh—Warehouses advanced their finished steel prices from 2.5 to 3 per cent, effective with orders July 8. The percentage of increase is slightly less than the mill increase.

Cleveland—Vacation shutdowns at manufacturing plants in this area are being sharply reflected in slackened demand for steel at the warehouse level.

Despite the sluggish demand local distributors are following the mills and marking up their prices. Newly issued lists show hot-rolled sheets up $4 per ton; cold-rolled sheets $5.20; galvanized sheets $4; hot-rolled strip $2.80; hot-rolled bars $4.60; cold-finished carbon bars $4; alloy bars $4.40; structural shapes $4.60; carbon plates $3.80; floor plates $3.60.

Cincinnati — General increase in warehouse prices, as result of higher mill quotations, has been effected here. Hot-rolled sheets are up from 6.30c to 6.48c; cold-rolled sheets from 7.11c to 7.37c; hot-rolled strip from 6.66c to 6.86c; hot-rolled rounds from 6.52c to 7.75c; cold-finished rounds from 7.60c to 7.80c; hot-rolled alloy bars from 11.85c to 12.15c; standard

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305....	$4.75	$4.75	$4.70	$5.03
Bar Size Angles	4.50	4.50	4.40	4.73
Structural Angles	4.50	4.50	4.40	4.73
I-Beams	4.50	4.50	4.40	4.73
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'....	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	25.70	25.50	26.34
Barbed Wire	6.75	6.75	6.75	7.08
Merchant Bars	6.75	4.75	4.70	5.03
Hot-Rolled Bands	4.90	4.90	4.85	5.18
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5..	5.23	5.20	5.28	5.55
Bright Common Wire Nails, 8d	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

Sizes O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

structural shapes from 6.93c to 7.16c; carbon plates from 6.62c to 6.81c; floor plates from 7.71c to 7.89c.

Chicago — Steel warehouses have not fully repriced their products in line with the higher mill prices but it appears the boost will average out at about $4.25 a ton.

Baltimore — Steel distributors, meeting competition with Philadelphia and York, Pa., have stabilized prices on some products at levels less than they had been quoting a week ago. Thus, on base quantities of 2000 to 9999 pounds, f.o.b. warehouse, hot-rolled strip is 6.89c; shapes 6.92c; plates 6.57c; and floor plates, heavier gages, 7.96c.

On the other hand, hot-rolled sheets are up slightly at 6.22c and cold-rolled sheets are up substantially at 7.51c. Hot-rolled bars are a little higher at 6.88c.

Richmond, Va. — To meet outside competition, warehouses have reduced prices, running counter to the trend in certain other districts where prices had been badly slashed but now are being advanced under stimulus of higher mill prices.

On base quantities of 2000 to 9999 pounds, f.o.b. warehouse, hot-rolled sheets are now 6.43c; cold-rolled sheets 7.39c; hot-rolled strip 6.77c; hot-rolled bars 6.71c; cold-finished bars 8.08c; shapes 7.08c; carbon plates 6.65c; floor plates, both heavy and light gages, 8.08c.

San Francisco—Warehouse prices have been advanced from 20 cents to 30 cents a hundred pounds.

Steel Output Tops 1947-49 Average

Production of ingots and steel for castings in first six months falls substantially under that of like 1953 first half but is 6.9 per cent above the average for the base period

New York—Production of ingots and steel for castings during June totaled 7,361,000 net tons, reports the American Iron & Steel Institute. This was down slightly from production of 7,472,738 tons in May, but it was 6.9 per cent above the average for the 1947-49 period. In June, 1953, output totaled 9,404,479 net tons.

June production raised output for second quarter to 21,804,675 net tons, comparing with 22,324,323 tons in the first quarter of this year and with 28,047,097 in the second quarter of last year. Second quarter output was 4.4 per cent above the average for 1947-49, while first quarter production was 8.1 per cent above the 1947-49 average.

First half production totaled 44,128,998 net tons. This was a decline of 13,816,938 tons compared with output of 57,945,936 tons in the first six months of last year. However, the total for the period was only about 900,000 tons below production in the first half of 1952, and it was 6.2 per cent above the average for the three years 1947-49.

Ingot operations averaged 71.5 per cent in the first half as against 99.4 per cent a year ago. Second quarter operations were 70.3 per cent, comparing with 72.8 in first quarter and with 98.7 in second quarter of 1953. June operations averaged 72 per cent of capacity, up from the 70.7 per cent reported for May.

Steelmaking capacity at start of this year exceeded 124.3 million net tons.

Steel Shipments Rise in May

New York—Direct mill shipments of finished steel increased slightly from April to May, and a record-breaking tonnage went to container manufacturers, reports the American Iron & Steel Institute. Total May shipments were 5,423,168 net tons, compared with 5,287,972 in April and 7,209,396 in May of last year.

The increase in shipments to container manufacturers, mostly canmakers, was 168,000 tons in May over April, exceeding the increase in total steel shipments. The nearly 691,000 tons for containers in the month was 116,000 tons larger than in May last year. Only one other major classification showed a year-to-year gain in May, that being agricultural equipment. Total for the latter was

(*Please turn to page* 164)

	OPEN HEARTH			BESSEMER			ELECTRIC			TOTAL			Calculated weekly production (Net tons)	Number of weeks in month
Period	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index		
1954														
January	7,256,526	78.3	113.3	260,453	64.0	74.1	434,507	48.9	121.7	7,951,486	75.3	111.8	1,794,918	4.43
February	6,523,213	77.9	112.8	174,253	47.4	54.9	385,771	48.1	119.6	7,083,237	74.3	110.2	1,770,809	4.00
March	6,649,667	71.7	103.8	207,726	51.1	59.1	432,207	48.7	121.0	7,289,600	69.0	102.5	1,645,508	4.43
1st Qtr.	20,429,406	75.9	109.9	642,432	54.4	63.0	1,252,485	48.6	120.8	22,324,323	72.8	108.1	1,735,950	12.86
April	6,365,326	70.9	102.7	162,657	41.3	47.8	442,954	51.5	128.2	6,970,937	68.1	101.3	1,624,927	4.29
*May	6,817,951	73.6	106.4	198,063	48.7	56.4	456,724	51.4	127.9	7,472,738	70.7	105.0	1,686,848	4.43
†June	6,697,000	74.6	108.0	208,000	52.8	61.2	456,000	53.0	131.9	7,361,000	72.0	106.9	1,716,000	4.29
2nd Qtr.	19,880,277	73.0	105.7	568,720	47.6	55.1	1,355,678	52.0	129.3	21,804,675	70.3	104.4	1,675,993	13.01
1st Half	40,309,683	74.5	107.8	1,211,152	51.0	59.0	2,608,163	50.3	125.1	44,128,998	71.5	106.2	1,705,798	25.87
1953														
January	8,841,679	101.4	138.0	350,200	88.9	99.7	706,083	81.2	197.7	9,897,962	99.1	139.1	2,234,303	4.43
February	7,939,299	100.8	137.2	329,389	92.6	103.8	664,091	84.6	205.9	8,932,779	99.1	139.0	2,233,195	4.00
March	9,050,773	103.7	141.3	354,710	90.0	101.0	762,615	87.7	213.5	10,168,098	101.8	142.9	2,295,282	4.43
1st Qtr.	25,831,751	102.0	138.9	1,034,299	90.4	101.4	2,132,789	84.5	205.7	28,998,839	100.0	140.4	2,254,964	12.86
April	8,493,909	100.5	137.0	334,605	87.7	98.4	717,024	85.2	207.4	9,545,538	98.7	138.7	2,225,067	4.29
May	8,925,163	102.3	139.3	354,577	90.0	100.9	717,340	82.5	200.8	9,997,080	100.1	140.5	2,256,677	4.43
June	8,394,502	99.4	135.4	332,060	87.0	97.7	677,917	80.5	196.1	9,404,479	97.2	136.6	2,192,186	4.29
2nd Qtr.	25,813,574	100.8	137.3	1,021,242	88.3	99.0	2,112,281	82.7	201.5	28,947,097	98.7	138.6	2,224,988	13.01
1st Half	51,645,325	101.4	138.1	2,055,541	89.3	100.2	4,245,070	83.6	203.6	57,945,936	99.4	139.5	2,239,889	25.87
July	8,316,342	95.5	129.8	324,068	82.4	92.2	635,263	73.2	177.9	9,275,673	93.1	130.4	2,098,569	4.42
August	8,463,155	97.0	132.1	310,074	78.7	88.2	632,351	72.7	177.0	9,405,580	94.2	132.2	2,123,156	4.43
September	8,076,277	95.8	130.3	287,638	75.6	84.6	519,513	61.9	150.3	8,883,428	92.1	129.0	2,075,567	4.28
3rd Qtr.	24,855,774	96.1	130.8	921,780	78.9	88.4	1,787,127	69.4	168.6	27,564,681	93.1	130.6	2,099,366	13.13
9 mos.	76,501,099	99.6	135.6	2,977,321	85.8	96.2	6,032,197	78.8	191.8	85,510,617	97.3	136.5	2,192,580	39.00
October	8,648,428	99.1	135.0	325,250	82.6	92.6	489,044	56.3	136.9	9,462,722	94.7	133.0	2,136,055	4.43
November	8,002,349	94.7	129.1	283,321	74.3	83.3	404,382	48.0	117.0	8,690,052	89.9	126.2	2,025,653	4.29
December	7,321,947	84.1	114.3	269,813	68.6	76.8	354,568	40.9	99.3	7,946,328	79.7	111.7	1,797,812	4.42
4th Qtr.	23,972,724	92.6	126.1	878,384	75.2	84.2	1,247,994	48.4	117.7	26,099,102	88.1	123.6	1,986,233	13.14
2nd Half	48,828,498	94.4	128.4	1,800,164	77.1	86.3	3,035,121	58.9	143.2	53,663,783	90.6	127.1	2,042,778	26.27
Total	100,473,823	97.9	132.2	3,855,705	83.2	93.2	7,280,191	71.1	173.1	111,609,719	94.9	132.2	2,140,578	52.14

Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954 as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,680 net tons, total 124,330,410 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1953 of 1,969,275 net tons open hearth, 88,934 net tons bessemer and 196,250 net tons electric ingots and steel for castings, total 2,254,459 net tons; based on annual capacities as of Jan. 1, 1953 as follows: Open hearth 102,677,980 net tons, bessemer 4,637,000 net tons, electric 10,232,490 net tons, total 117,547,470 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

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124,000 tons, compared with 126,000 in April and 106,000 in May, 1953.

Direct mill shipments to the automotive industry totaled 1,001,300 tons in May, or 19.1 per cent of domestic shipments. In comparison, the automotive industry received 910,677 tons in April, 18 per cent of that month's domestic total.

Shipments of construction and contractors' products continued high. The total was 985,301 tons, or 18.9 per cent of domestic shipments in May. The total in five months this year at 5,097,000 tons was 200,000 less than one year earlier. The five-month shipments were 19.3 per cent of steel shipments, against 15.4 per cent one year earlier. For construction other than railroad buildings and oil and gas, shipments in five months were 2,844,000 tons, or 137,000 more than in the similar period last year.

Warehouses received 1,012,329 tons of steel in May, 19.3 per cent of domestic shipments, against 990,170 tons, or 19.6 per cent in April.

Sheets, Strip . . .

Sheet and Strip Prices, Page 156 & 157

New York—United States Steel Products Division, U. S. Steel Corp. announced new prices on its line of steel drums and pails, effective July 12. The price revisions represent increases ranging from approximately 3 to 4 per cent on drums, and 6 per cent on pails.

Philadelphia — Galvanized sheets are relatively more active than the other sheet items, this being particularly true of the continuous hot dipped product. Hot-rolled carbon sheets are somewhat more active than cold-rolled.

Pittsburgh — Producers report the price increases have had no effect on demand for sheets. A pickup in galvanized orders continues, spurred by needs of air conditioning manufacturers. Hot and cold-rolled sheet demand is lagging in July. A September increase is expected.

Strip producers note a pickup in fall ordering.

Cleveland — Impact of the higher sheet prices on demand will not be immediately determined for the reason July and August manufacturing requirements will be off seasonally because of vacations. Generally, the mills do not anticipate much change in order volume until August when buying for September and later delivery is expected to start.

Cincinnati—Sheet production has reached a low point in the greater Cincinnati area with one mill down for vacations.

Steel Export Prices Raised

New York—New export prices have been announced on various steel products by the United States Steel Export Co. The new prices became effective July 3 on shipments from producing mills and include freight to New York, Philadelphia and Baltimore. The new prices quoted are as follows:

CARBON STEELS	Per Net Ton
Billets, blooms and slabs	
Re-rolling quality	$74.00
Forging quality	88.00
Tube rounds	106.50
Standard rails—61 lbs and over	95.70
	Per 100 Lbs
H.R. Bars & Small Shapes	4.84
Skelp	4.52
Standard structurals	4.85
C.B. sections and bearing piles	4.85
Plates	4.83
Floor plates	5.88
Sheet piling	5.67
Reinforcing bars	4.38
Cold Finished bars	6.04
Vitrenamel sheets, 12 Ga.	6.23
Electrical sheets, H.R. Cut lengths, 22 Ga Electrical grade	9.70
Cold rolled strip (.25 carbon and under)	6.39
Tight cooperage hoop	5.10
WIRE PRODUCTS	
Wire rods	4.86
Bright nail wire	5.94
Black annealed wire	6.69
Galvanized plain wire	7.24
	Per 80 Rod Spool
Barbed wire	
Lyman 4-pt. 5 in.	7.17
	Per 100 lbs
Glidden 4-pt 3-in. or 6-in.	8.23
Iowa 4-pt 3-in. or 6-in.	8.23
Waukegan 4-pt. 3-in. or 6-in.	8.33
Nails (bright)	7.10
Staples (bright)	7.18
AMERICAN STANDARD PIPE T & C	
Buttweld, 2½ in. and 3 in.	
Black	31.445 discount
Galvanized	15.195 discount
Buttweld, 3½ in. and 4-in.	
Black	22.695 discount
Galvanized	5.945 discount
Seamless-Black	
2-in.	7.865 discount
2½-in.	11.865 discount
3-in.	14.365 discount
3½-in. and 4-in.	18.7 discount
5-in.	17.95 discount
6-in.	20.45 discount
Seamless Galvanized	
2-in.	Plus 7.135 discount
2½-in.	Plus 4.885 discount
3-in.	Plus 2.385 discount
3½ and 4-in.	1.95 discount
5-in.	1.20 discount
6-in.	3.70 discount
ALLOY STEELS	Per Net Ton
Billets, blooms and slabs	$96.00
	Per 100 lbs.
H.R. Bars	5.30
Plates	6.40
Structurals and bar shapes	5.80
H.R. strip	7.32
Cold finished bars	6.85
HIGH STRENGTH STEELS	Per 100 lbs.
Corten	
Plates	7.05
Structurals	7.00
C.B. sections	7.00
H.R. bars and bar shapes	7.05
Manten	
Plates	5.88
Structurals	5.85
C.B. sections	5.85
HR bars and bar shapes	5.70
A-R STEELS	
Plates	5.98
HR bars and small shapes	6.05
HR sheets	5.95
HR strip	5.83

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STAINLESS
CARBON STEELS
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HEXAGONS · SPECIAL
SHAPES & PROTOTYPE
FORGINGS**

FLATS	Thick	Wide	Long
	¼″	¾″-4″	8 ft.
	⅜″	½″-6″	10 ft.
	½″	⅝″-6″	10 ft.
	⅝″-⅞″	¾″-10″	12 ft.
	1″-1¼″	1⅛″-10″	12 ft.
	1⅜″-1¾″	1½″-10″	16 ft.
	1⅞″-3″	2″-12″	16 ft.
	3⅛″-5″	3¼″-16″	16 ft.

ROUNDS — ½″-12″
SQUARES — ½″-12″
HEXAGONS — ½″-5″
Max. Bar Wgt. 5000 lbs.
Max. Bar Lgt. 20 ft.

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America's largest clock was recently rebuilt for a spectacular illuminated sign in Chicago. It measures 50 ft. in diameter — hands and movement weigh 3000 lbs. The new driveshaft was made from 6 ft. of 3½-inch round "B" No. 3X heat-treated bar, chosen for its machinability as well as its high physical properties.

"B" No. 3X heat-treated bars machine more readily and finish more smoothly than standard alloys because of their particular analysis and method of manufacture. They cut costs by eliminating distortion, scaling, straightening — and often grinding — as well as the cost of heat-treating finished parts.

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Stainless Steel . . .

Stainless Steel Prices, Page 160

Pittsburgh—Because of heavy competition, stainless steel did not share in the general price increase. Progress of wage talks with aluminum producers, and resultant effect on price of aluminum, may determine whether stainless prices go up. Adjustments are unlikely in sheets, while increases may come in bars, wire and tubular products.

Steel Bars . . .

Bar Prices, Page 156

Pittsburgh—Wyckoff Steel Co. announced changes in bar prices effective 12:01 A.M., July 7. Cold finished carbon bars at Ambridge, Pa., and Chicago, cost 5.40c as compared with the earlier price of 5.20c. Cold-finished carbon bars at Newark, N. J., will be 5.85c and at Putnam, Conn., 5.95c. Earlier prices were 5.65c and 5.75c respectively.

Cold-finished alloys bars at Wyckoff's Ambridge, Pa., and Chicago plants now cost 6.625c compared with 6.325c earlier. Cold-finished alloy bars at Newark, N. J., cost 6.80c. Earlier price was 6.65c.

New York—July vacations are retarding bar business. According to some sellers, orders this month are lagging behind June, and one reason is that so many plants are either down or are scheduled to be down before end of this month for mass vacations. Feeling prevails in some quarters that such suspensions will continue to curb business throughout August as well.

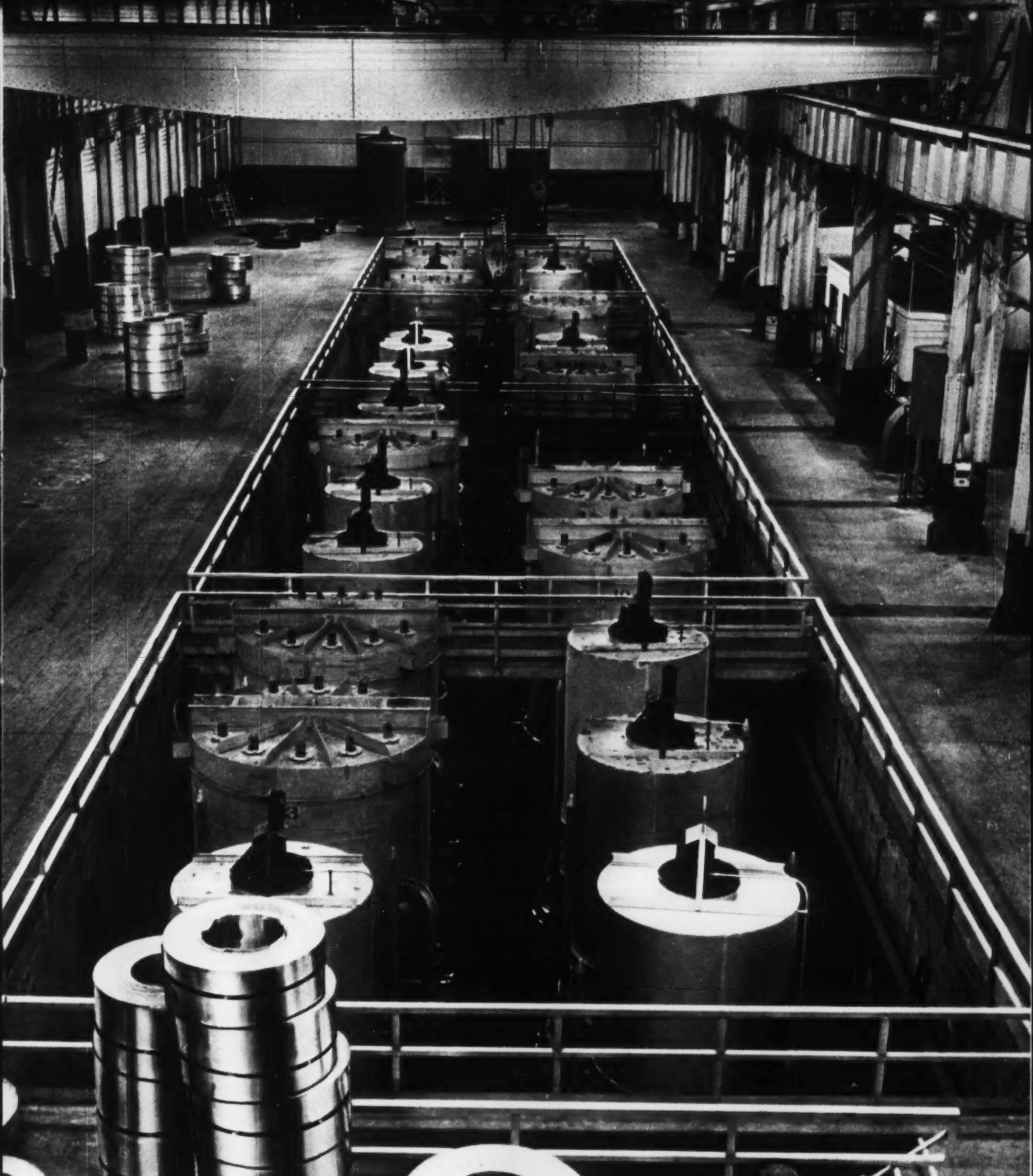
Independent cold drawers in the East advanced their prices on cold drawn carbon $4 a ton and on cold drawn alloy $6.

Philadelphia—District drawers of cold bars have increased their prices $4 per ton on carbon and $6 on alloy. Some cold-finishers report business as fairly good, others, as spotty.

Cleveland — Test of the new prices on bars is not seen until later in the summer when buying for fourth quarter is expected to develop. For the most part, it is believed the prices will stick though competitive conditions in the market are seen continuing severe through remainder of the year.

Under the new price schedules, just announced, hot-rolled carbon bars are quoted $3 higher, cold-finished carbon bars $4, reinforcing bars $3, high-strength low-alloy bars $4.50 and hot-rolled alloy bars $4.

Chicago — Barmakers admit that consumers are unhappy over higher bar prices of $3 a ton on hot-rolled



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carbon, $4 on cold-finished carbon and markups of $4 and $6 on alloy grades. Buyers are making their protests vocal, biggest objections coming from product lines where competition is extremely keen.

Wire . . .

Wire Prices, Page 158

Los Angeles—Wire demand is reported increasing following several relatively inactive months. Trade authorities attribute quickened demand to larger automotive requirements and seasonal purchases.

San Francisco—Demand for wire products has been rising and producers are confident the trend will continue.

Plates . . .

Plate Prices, Page 156

Philadelphia — Eastern plate mills are still able to work in tonnage for rolling this month, a situation that reflects no improvement over that of several weeks ago. In fact, some producers describe conditions as even easier, attributing this principally to mass vacations at various plate fabricating shops. Most see no signs of early improvement.

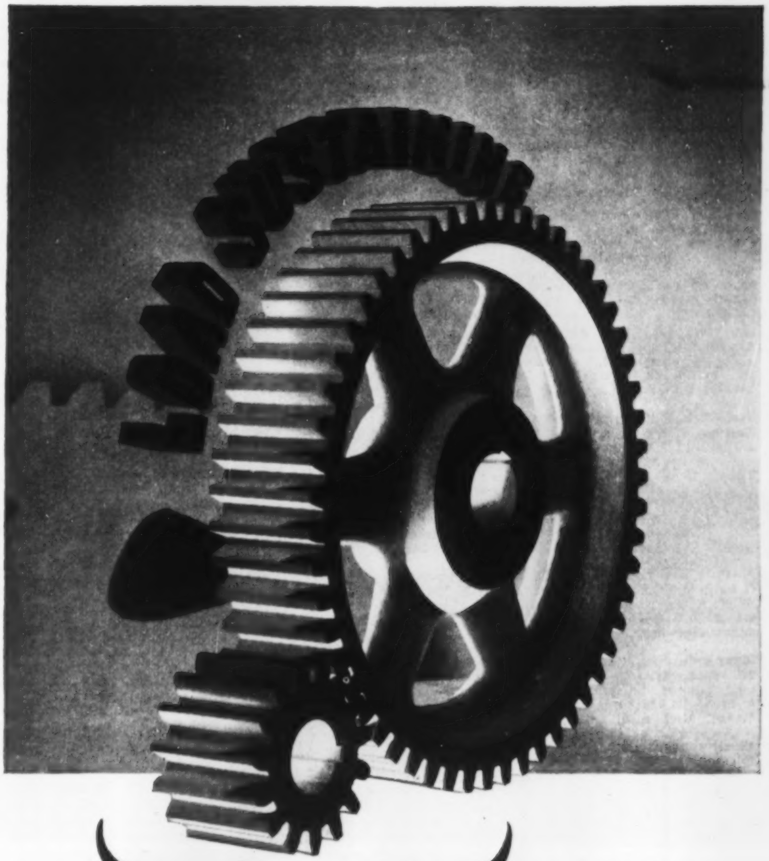
New York—Of all the major tonnage products, plates continue to move the most slowly. Eastern producers say business this month is slower than a few weeks ago, although seasonal influences are undoubtedly having much to do with it. All eastern mills, except the Harrisburg, Pa., producer, have advanced carbon plate prices, the increases amounting to $2.50 a ton. All producers of alloy plates advanced schedules $5 a ton.

Pittsburgh — Higher plate costs won't affect the commercial construction field. Railroad and fabricators' orders are slowing this month, and as a result July plate shipments may be the lowest in second and third quarters.

Washington — Following 11 years experimentation, American Bridge Division, U. S. Steel Corp., is now marketing all-steel swimming pools in a range of four sizes. Of all welded steel panel construction, the pools are fabricated of copper bearing steel throughout.

Los Angeles—Platemakers are reported rapidly filling their August order books.

Seattle—Subcontracts for approximately 2000 tons of plates for tanks and pipe lines for the Mountain Home Air Base fueling system have been placed.



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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min carloads, 30c; 2000 lb to min carloads, 35c; 250 lb to 199 lb, 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 0.75c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, C.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 10.8c per pound of contained silicon; 1" x down, bulk 25.25c per pound of contained chromium plus 11c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.80c per lb of contained Si, carload packed 12.40c, ton lot 13.85c, less ton 15.5c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 12.2c per pound contained silicon; carload packed 13.55c; ton lots, 14.75c; less ton, 16.1c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.8c per lb of contained Si, carload packed 15.1c, ton lot 16.25c, less ton 17.5c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.3c per lb of briquet. Packed c.l. 7.10c, ton lot 7.9c, less ton 8.8c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.45c. Packed c.l. 7.25c, ton lot 8.05c, less ton 8.95c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max. C 0.4% max). Contract, ton lot, 2" x D, $9.50 per lb of contained Cb, less ton $9.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, Pa., $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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ROBERT S. MACFARLANE
President
Northern Pacific Railway Company

"Combine a good product with enthusiastic salesmanship, capably directed, and favorable results are reasonably certain. This winning combination through a person-to-person canvass recently added more than 8,000 employees of the Northern Pacific Railway to the Payroll Savings Plan for purchase of U. S. Savings Bonds. It is gratifying to me that the organized efforts of Northern Pacific personnel not only have resulted in substantially increased systematic saving and a greater investment in America's future by our employees, but that the Treasury Department is using our campaign as an example throughout the railroad industry in its efforts to step up regular purchases through payroll deductions."

The U. S. Savings Bond *is* a good product . . . Payroll Savers *are* enthusiastic Bond Salesmen . . . company spirit *was* good because everybody on the Road knew that Mr. Macfarlane was 100% behind the effort to increase employee participation in Northern Pacific's Payroll Savings Plan.

But, there was still another, and very important, factor in the success of Northern Pacific's campaign that added more than 8,000 new Payroll Savers – a Person-to-Person Canvass.

A good Person-to-Person Canvass is an organized employee effort that puts a Payroll Savings Application Blank in the hands of every man and woman in the company. There is no pressure, no drive to "sign up." Every employee is free to make his own decision. That's all there is to a Person-to-Person Canvass, but in literally thousands of companies, as on the Northern Pacific, a high percentage of employees *want* to build their personal security and are quick to join the Payroll Savings Plan when its availability and many advantages are brought to their personal attention.

Upwards of 8,000,000 employed men and women are enrolled in the Payroll Savings Plan, most of them as a result of Person-to-Person Canvasses. Each month these Payroll Savers invest more than $160,000,000. The 1954 goal is 9,000,000 Payroll Savers. It can be reached if you and other executives will take a personal interest in the Plan and what it means to your employees, your company and your country.

If your company has the Payroll Savings Plan your State Director will be glad to help you organize a Person-to-Person Canvass that should increase employee participation to 50%, 60% or more. If you do not have a plan he will show you how easy it is to install one. Write to Savings Bond Division, U. S. Treasury Department, Washington, D. C.

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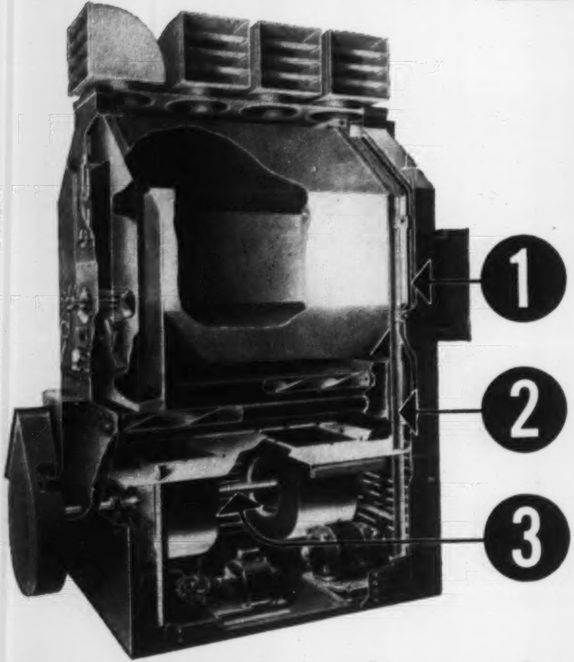

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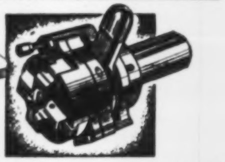

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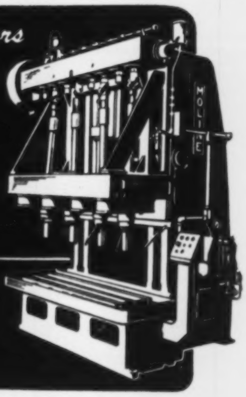

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By Albert Portevin

Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.

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Tubular Goods . . .

Tubular Goods Prices, Page 159

Chicago—Pipemakers are receiving a substantial number of inquiries for line pipe. If any sizable proportion converts into orders a goodly tonnage will result. Long-term prospects on this item are excellent although currently line pipe is the weakest in the tubular goods category. Just announced is award of a contract for a $12.5 million 16-inch crude oil pipeline to run 260 miles from Clearbrook, Minn., to Minneapolis-St. Paul.

Pittsburgh — Price increases have been made by larger producers, and shipments of oil country goods are continuing as strong as before. Buttweld shipments are holding level while seamless orders decline slightly.

Beaver Falls, Pa.—The Tubular Products Division, Babcock & Wilcox Co. announced price increases on seamless, carbon, mechanical and pressure tubes produced here, effective July 9.

Seattle—Cast iron pipe demand is seasonally normal. Recent lettings included 916 tons at Portland and 204 tons at Umatilla, Oreg. Tacoma, Wash., awarded the general contract for a system expansion involving 560 tons. Deliveries are reported prompt.

Seattle—Officials of Pacific Northwest Pipeline Corp. are signing contracts with gas distributors in the Pacific Northwest in anticipation of the delivery here of natural gas from the San Juan basin, New Mexico, by the end of 1955. Robert R. Herring, president, announces White, Weld & Co., New York banking investment firm, is completing plans for financing the $160 million project. He also stated negotiations are under way with producers for an estimated 300,000 tons of steel pipe involved in the 1460-mile line, estimated to cost $176 a ton delivered.

Tool Steel . . .

Tool Steel Prices, Page 160

Pittsburgh — Firth Sterling Inc., announced an increase in base prices and extras on tool and high speed steels of 4 per cent, effective July 9. Extras under 6.5 cents per pound are unchanged.

Crucible Steel Co. of America announced increases in base prices and extras for tool steels effective July 8. New prices are computed by adding 4 per cent to the nearest ½-cent to previous base prices and extras covering these steels. Extras under 6.5 cents per pound are unchanged.

Allegheny Ludlum Steel Corp., Firth Sterling Inc., and Latrobe Steel Co. made similar announcements.

ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$23.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-$1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account; 46-47%, $0.95-$0.97.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$21.00-$22.00
48% no ratio	34.00

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	2[illegible].12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

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*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

---

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

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Inches		Per
Diam.	Length	100 lb
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2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00
	CARBON	
40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 156

Seattle—The rolling mill of the Northwest Steel Rolling Mills Inc. is down until July 19 for vacations and annual overhaul. Electric furnaces continue to operate, however.

Order backlogs at midyear are described as normal. Potential business indicates full operations during last half.

Competition for reinforcing bar orders is extremely keen. Largest project pending involves 1600 tons for Washington state highway bridges, bids July 20.

Structural Shapes . . .

Structural Shape Prices, Page 156

New York — Early action is expected on award of 19,500 tons of structurals for the superstructure of a turnpike bridge to cross the Delaware river from Burlington, N. J., to a point near Edgely, Pa. American Bridge Division, U. S. Steel Corp., was low bidder at $10,991,362.50. This project is the largest pending in this area at present, but there is a fair accumulation of other work under active consideration.

Philadelphia — District structural activity still centers largely around bridge work. The state of Pennsylvania has stepped up its program, and several fair-sized projects are active. Nevertheless, there is a fairly good sprinkling of miscellaneous tonnage, and fabricators are not competing quite as sharply as they were, although there is still plenty of shading on attractive jobs.

Seattle—Fabricators entered the new quarter with fair order backlogs and prospects of steady operations to end of 1954. Several major contracts are pending.

Rails, Cars . . .

Track Material Prices, Page 159

Philadelphia—Budd Co. reports orders for all-stainless steel raiway passenger cars have been received by foreign licensees in Australia and Belgium. Commonwealth Engineering Co., Ltd., Australia, booked 80 coaches from the New South Wales government railroad and two self-propelled rail diesel cars from the Queensland government railroad. In Belgium, an order for 40 cars from the Belgian State Railways was given La Brugeoise Et Nicaise & Delcuve.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 159

Pittsburgh — Townsend Co. last week increased the price of large rivets to reflect recent advances in steel costs. In the eastern U. S. the new price for large rivets, one-half inch or more in diameter, is $9.25 per 100 lbs. The former price was $8.90. On the West Coast the price in carload lots went up 35 cents per 100 lbs, from $9.65 to $10. The less-than-carload price advanced from $10.40 to $10.75.

Semifinished Steel . . .

Semifinished Prices, Page 156

Houston, Tex.—Although the national ingot rate has been hovering around 70 per cent of capacity for some time past, Sheffield Steel Corp. has continued to operate at capacity right along, according to company officials. W. W. Sebald, president, Armco Steel Corp., of which Sheffield is a division, predicts an upturn in steel demand later this year.

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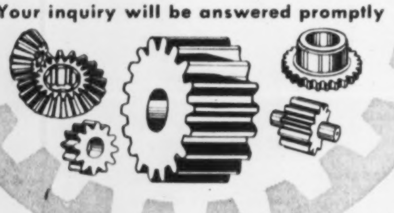

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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

800 tons, Pennsylvania railroad bridge, Pittsburgh, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

500 tons or more, 774-ft Idaho state Snake river bridge, to unstated interest; general contract to Bair-Crick Co. and Henry Hagman, Spokane, Wash., low $407,137.

430 tons, warehouse, Yorktowne Grocery Co., York, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, dry kiln addition, Weyerhaeuser Timber Co. plant, Raymond, Wash., to Isaacson Iron Works, Seattle.

100 tons, intake gate equipment, 14 units, etc., The Dalles dam, to Premier Gear & Machine Works, Portland, Oreg., low $64,389 to U. S. Engineer.

STRUCTURAL STEEL PENDING

19,500 tons, superstructure, turnpike bridge, between Burlington, N. J., and point near Edgely, Pa., American Bridge Division, U. S. Steel Corp., Pittsburgh; also required are 1800 tons of reinforcing bars and 13,400 feet of parapet railing.

5000 tons, state bridge, Luzerne county, Pennsylvania, Central Pennsylvania Quarry & Stripping Co., Hazelton, Pa., low on general contract.

2600 tons, Vine street bridge, Philadelphia, Lipset Inc., that city, low on general contract.

300 tons, Port of Seattle grain elevator extension; bids in.

REINFORCING BARS . . .

REINFORCING BARS PLACED

160 tons, Montana state highway project at Butte, to Bethlehem Pacific Coast Steel Corp., Seattle.

125 tons, addition to Queen Anne high school, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1000 tons, also 35 tons of shapes, Washington state Chehalis river bridge approaches; bids to Olympia, Wash., July 20.

500 tons, Washington state Mt. Vernon overcrossing, also 75 tons in Walla Walla and Grant counties; bids to Olympia, Wash., July 20.

350 tons, highway span, Copper river district, Seattle; Boen-Egge and Cummins-Koon Co., Seattle, joint low $2,739,390 to Bureau of Public Roads.

PLATES . . .

PLATES PLACED

1000 tons, fuel storage tanks, Mountain Home, Idaho, air base, to Chicago Bridge & Iron Co., Seattle; general contract to Thorn & Marble, Seattle, low $986,203.

1000 tons, pipe lines up to 30-inch diameter, Mountain Home project, to National Tube Division, U. S. Steel Corp.

100 tons or less, water storage tank, Umatilla, Oreg., to Gunderson Bros. Engineering Corp., Portland, Oreg., low $17,115.

PLATES PENDING

300,000 tons, for 1460-mile natural gas pipeline from San Juan basin, New Mexico, to Pacific Northwest; Pacific Northwest Pipeline Corp., now negotiating for materials.

1700 tons, eight grain storage tanks; bids to Commission of Public Docks, Portland, Oreg., July 21.

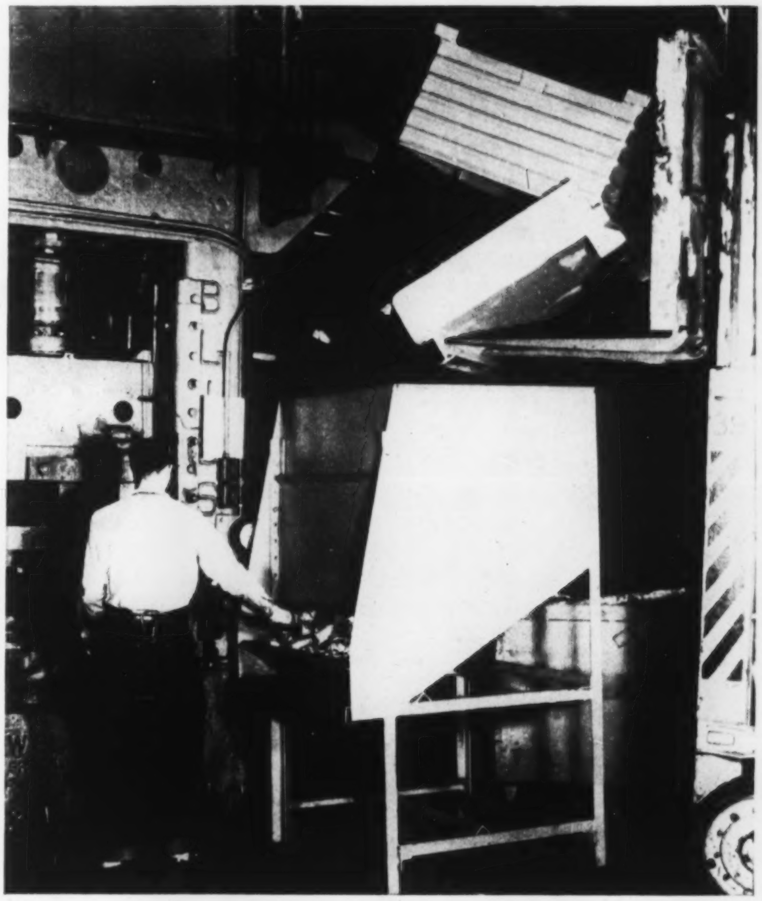
PIPE . . .

CAST IRON PIPE PLACED

916 tons, 8 and 6-inch, water system projects, Portland, Oreg., to U. S. Pipe & Foundry Co., Seattle.

204 tons, Umatilla, Oreg., also 38 tons for Salem, Oreg., to U. S. Pipe & Foundry Co., Seattle.

Production cost down 38.6%



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Take the typical operation shown above. First, work-level positioning eliminates waste motion; cuts costs by 18.8%. Secondly, since the hopper, with parts reservoir, holds a mass supply at the use point, there's no *waiting* for material. An extra hour of work is realized. The *total* saving is 38.6% per 8 hour day!

For detailed time and motion studies; for information on the various Work-O-Matic units now available, write to The Union Metal Manufacturing Company, Canton 5, Ohio.

**Patent No. 2,445,038. Other patents pending.*

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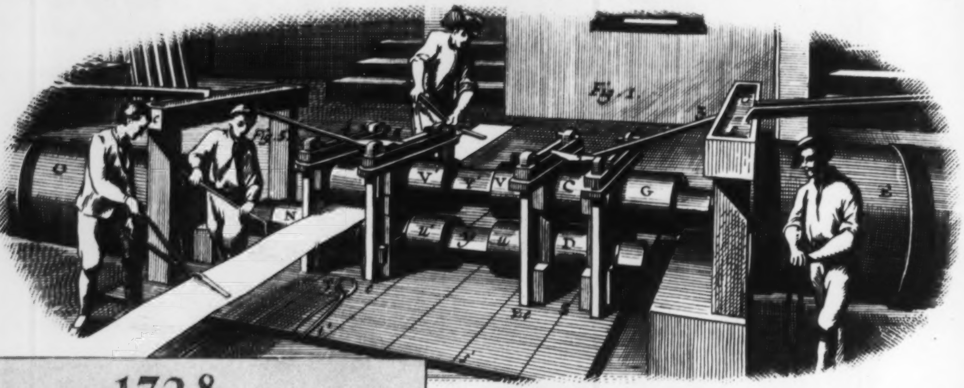
GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING



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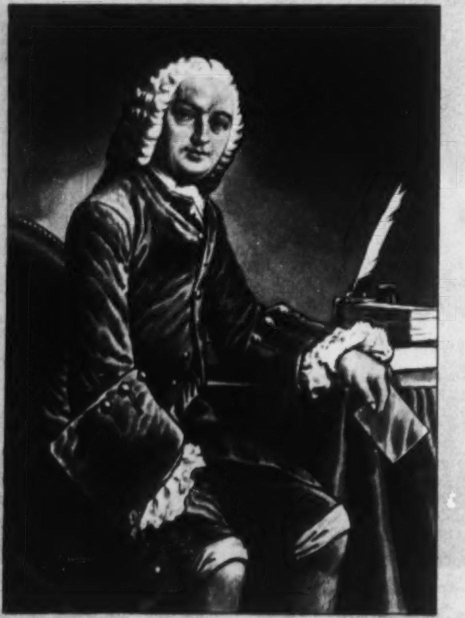

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When Major John Hanbury demonstrated the hot rolling of sheets on a two-high mill in Pontypool, England, in 1728, he introduced pack rolling to the steel industry.

Since then, obviously, some improvements have been made in the process, although the pack method as originally conceived by Major Hanbury has continued practically unchanged to the present day.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Scrap Marking Time in Dull Market

Prices virtually unchanged at all consuming points as mills and foundries continue on sidelines. Upturn in buying not expected until later in summer

Scrap Prices, Page 178

Chicago—Buying of steelmaking scrap is so light it gives no support to the market. Prices continue fairly well pegged at the generally $1 lower prices of a week ago.

Material of industrial origin only is acceptable and then only from preferred sources.

No. 1 factory bundles sold for $12 a gross ton and No. 1 heavy melting steel at $31. No. 2 heavy melting is weak at $27, as is the case for most dealer offerings.

Cast grades are almost without demand with a large percentage of gray iron foundries closed this month.

New York—Except for an advance on No. 2 heavy melting to a range of $16 to $17, brokers' buying prices are unchanged. Most activity centers around export, with little buying for domestic account.

Pittsburgh—Prices hold steady at lower levels established last week. With market sentiment weak, volume sales now could establish lower prices. Punchings and plate scrap show increasing strength, moving up $1 to $32 to $33.

Cleveland—Only small tonnages of scrap are moving to the mills and foundries with the result the market is without test. In the absence of representative sales, however, brokers' offerings on open-hearth grades for mill delivery are off another $1 per ton with No. 1 heavy melting $24 to $25. Not much change in market conditions is expected until well into August.

Seattle—The scrap market is steady at the higher levels established two weeks ago with No. 1 and No. 2 heavy melting $25 and $21 respectively. There is little buying interest currently. Dealers report no over-supply but say tonnage is sufficient to care for going needs. Cast iron scrap is firm with $35 quoted tops for No. 1 cupola.

No scrap exports are moving from the Pacific Northwest.

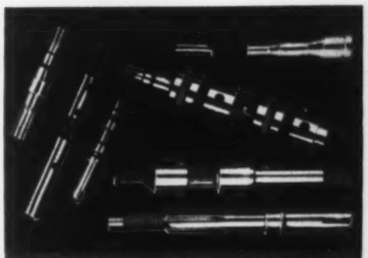
Philadelphia — Sellers of domestic scrap have advanced their prices $1 a ton on No. 1 and No. 2 heavy melting steel, No. 1 bundles and No. 1 busheling, in an effort to become more competitive with exporters. Two cargoes, one split, are expected to leave here this month with other shipments scheduled to follow in August. Meanwhile, movement of the above mentioned grades to domestic mills is confined to old contracts. Structurals and plate have advanced $1 to $27, this increase being due to domestic buying and having no relation to the export market. Cast grades are steady.

Los Angeles—Demand for steelmaking grades of scrap remains depressed. Columbia-Geneva Division, U. S. Steel Corp., is almost entirely out of the market, and Bethlehem Pacific Coast Steel Corp.'s purchases are restricted.

Cincinnati—Local scrap prices, based on out-of-town buying, are nominal. No. 2 bundles were lowered $2 per ton. All other open-hearth grades and heavy breakable cast, drop broken machinery, and both types of rails, were reduced $1.

Washington—Consumption of ferrous materials (scrap and pig iron)

(*Please turn to page* 180)



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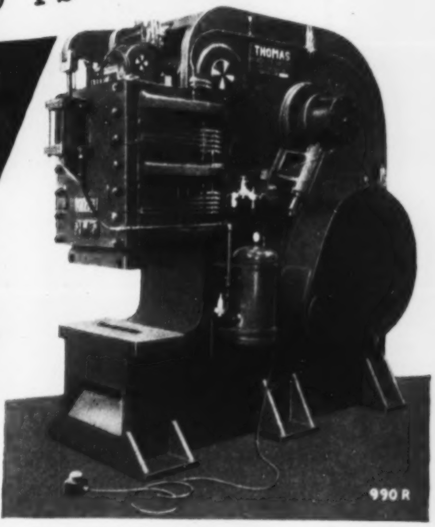

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For rounds, squares, flats, angles or channels

THOMAS
MACHINE MANUFACTURING COMPANY
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28

PUNCHES · SHEARS · PRESSES · BENDERS · SPACING TABLES

IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

July 14	$27.67
July 7	27.33
June Avg.	27.92
July, 1953	43.51
July, 1949	19.21

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals	29.00-30.00
Heavy turnings	*26.00-27.00*
Punchings & plate scrap	*32.00-33.00*
Electric furnace bundles	30.00-31.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Charging box cast	32.00-33.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	23.00-24.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
Rails, 2-ft and under	42.00-43.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	36.00-37.00
Railroad specialties	33.00-34.00

Stainless Steel Scrap

(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*24.00-25.00*
No. 2 heavy melting	*21.00-22.00*
No. 1 bundles	*24.00-25.00*
No. 2 bundles	*18.00-19.00*
No. 1 busheling	*24.00-25.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	25.00-26.00
Cut structural plate 2 ft and under	31.00-32.00
Alloy free, short shovel turnings	16.50-17.50
Electric furnace bundles	25.00-26.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	26.50-27.50
Stove plate	33.00-34.00
Heavy breakable cast	25.50-26.50
Unstripped motor blocks	25.00-26.00
Brake shoes	29.00-30.00
Clean auto cast	42.00-43.00
No. 1 wheels	32.50-33.50
Burnt cast	27.00-28.00
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
R.R. malleable	40.00-41.00
Rails, 3-ft and under	42.00-43.00
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	39.00-40.00
Cast steel	33.00-34.00
Railroad specialties	34.00-35.00
Uncut tires	35.00-36.00
Angles, splice bars	41.00-42.00
Rails, rerolling	42.00-43.00

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	*21.00-22.00*
No. 1 bundles	*26.00-27.00*
No. 2 bundles	*19.00-20.00*
Machine shop turnings	13.00-14.00
Short shovel turings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	29.00-30.00
Electric furnace bundles	27.00-28.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*24.00*
No. 2 heavy melting	*22.00*
No. 1 bundles	*25.00*
No. 2 bundles	18.00-19.00
No. 1 busheling	*24.00*
Electric furnace bundles	25.00*
Machine shop turnings	14.00
Mixed borings, turnings	15.00
Short shovel turnings	17.00
Structurals & plate	*27.00*
Heavy turnings	22.00*
Couplers, springs, wheels	31.00
Rail crops, 2 ft & under	41.00

Cast Iron Grades

No. 1 cuploa	35.00
Malleable	37.00
Heavy breakable cast	35.50
Unstripped motor blocks	nom.
Drop broken machinery	41.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	18.00-19.00
No. 2 heavy melting	*16.00-17.00*
No. 1 bundles	18.00-19.00
No. 2 bundles	12.25-13.25
Machine shop turnings	5.00-6.00
Mixed borings, short turnings	8.00-9.00
Low phos. (structural & plate)	21.00-22.00
Short shovel turnings	9.00-10.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstriped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	17.00
No. 2 heavy melting	15.25-16.00
No. 1 bundles	17.00
No. 2 bundles	13.25-14.25
Machine shop turnings	3.00-3.50
Mixed borings, turnings	5.50-6.00
Short shovel turnings	10.00-10.50
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

CINCINNATI

(Brokers' buying prices; f.o.b shipping point)

No. 1 heavy melting	*25.00-26.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*25.00-26.00*
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*25.00-26.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos. 18-in.	32.00-33.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	*35.00*
Charging box cast	36.00
Drop broken machinery	*44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	29.00-30.00
Rails, 18-in. and under	*43.00-44.00*
Rails, random lengths	*36.00-37.00*

CHICAGO

No. 1 heavy melting	*29.00-31.00*
No. 2 heavy melting	26.00-27.00
No. 1 factory bundles	31.00-32.00
No. 1 dealer bundles	*28.00-29.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling	*29.00-31.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	*14.00-15.00*
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut structurals, 3-ft	*32.00-33.00*
Punchings & plate scrap	*32.00-33.00*

Cast Iron Grades

No. 1 cupola	*35.00-36.00*
Stove plate	31.00-33.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	*37.00-38.00*
Drop broken machinery	*37.00-38.00*

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	43.00-44.00
Rails, 18-in. and under	44.00-45.00
Angles, splice bars	37.00-38.00
Rails, rerolling	*43.00-44.00*

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00
430 turnings	20.00-22.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	19.00
No. 2 heavy melting	17.00
No. 1 bundles	20.00
No. 2 bundles	15.00
No. 1 busheling	20.00
Machine shop turnings	9.00
Mixed borings, turnings	9.00
Short shovel turnings	9.50
Punchings & plate scrap	23.50

Cast Iron Grades

No. 1 cupola	33.00
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	24.00
Unstripped motor blocks	18.00
Clean auto cast	37.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	25.00-26.00
No. 2 bundles	19.00-20.00
No. 1 busheling	25.00-26.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	17.50-18.00
Short shovel turnings	18.50-19.00
Cast iron borings	17.50-18.00
Low phos.	29.00-29.50

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	41.00-42.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	23.50-24.50
No. 2 heavy melting	22.00-23.00
No. 1 bundles	18.00-19.00
No. 2 bundles	16.00-17.00
Cast iron borings	13.00-14.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	26.00-27.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.50-44.50
Stove plate	40.50-41.50
Bar crops and plate	29.00-30.00
Structural plate 2 ft.	29.00-30.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	39.00-40.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	26.50
No. 2 heavy melting	24.50
No. 1 bundles	26.50
No. 2 bundles	20.25
Machine shop turnings	12.00
Short shovel turnings	14.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	39.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.50
Rails, 18-in. and under	41.00
Rails, random lengths	38.00
Rails, rerolling	44.00
Uncut tires	32.50
Angles, splice bars	33.50

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	25.00
No. 2 heavy melting	21.00
No. 1 bundles	21.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turnings	11.50
Mixed borings, turnings	11.50
Short shovel turnings	11.50
Electric furnace, No. 1	32.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cuploa	42.00-45.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	5.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	38.00-42.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Busheling, new factory: Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

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†F.o.b., shipping point.

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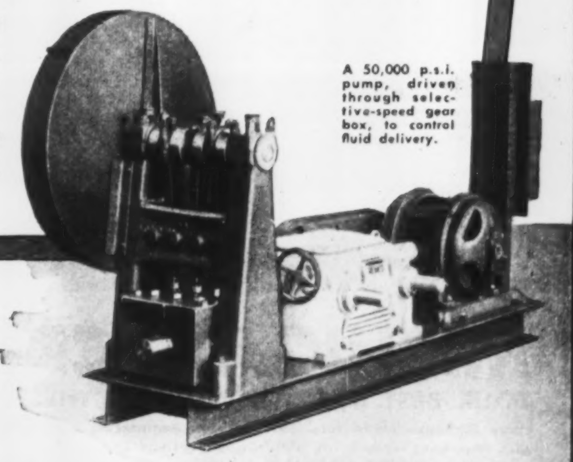

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(Concluded from page 177)

during May increased 4.2 per cent over April, reports the Bureau of Mines. Daily consumption rate during the month was virtually unchanged from the previous month. The total melt, 8,965,000 gross tons, consisted of 53.3 per cent scrap and 46.7 per cent pig iron, practically unchanged from April.

Scrap for consumption during the month totaled 4,542,000 gross tons, 4 per cent above April. Home scrap accounted for 2,637,000 tons and purchased scrap 1,905,000 tons. Of the purchased material 81 per cent came from dealers and 19 per cent from other sources.

Stocks of ferrous scrap held by consumers totaled 5,637,000 gross tons, decreasing for the fifth consecutive month.

Detroit—Reflecting curtailed steelmaking operations here because of vacations, the scrap market is lifeless. Prices, however, are holding for the present at last week's levels.

Buffalo—Despite slower steel production scrap prices are holding. At least one leading mill here plans additional purchases at current quotations. Dealers, however, are wary as mills are showing little interest in water receipts, which to date are negligible. Receipts from the eastern seaboard by way of the canal are at a minimum.

Pig Iron . . .

Pig Iron Prices, Page 160

Cleveland — With foundry operations down because of shop suspensions for mass vacations, demand for merchant pig iron is currently at low ebb. No immediate pickup in buying is anticipated with furnace stocks large and prompt shipments available, necessitating only minimum stockpiling by consumers.

The sluggish state of the market is reflected in the fact no change in pig iron prices was made in the general advance in iron and steel quotations effected by producers to at least partially offset the recent wage increase granted to steelworkers.

New York—A mild increase in the movement of pig iron, although scarcely more than discernible, is taking place, now that a number of foundries which were closed down for mass vacations earlier this month have resumed operations. However, some others are down at present and still others have vacation suspensions ahead.

Buffalo — The merchant pig iron market here remains in the doldrums with approximately 90 per cent of current output, which is 50 per cent of capacity, going into ingot production. Vacations and labor trouble are contributing factors to slack demand for iron.

Philadelphia — The merchant pig iron market is listless here. Vacations and hot weather continue to restrict foundry operations, which for a long time have not been too active.

Pittsburgh—Pig iron producers are reluctant to increase prices due to abnormally low shipments in July. Trend is toward vacations of two and three weeks at virtually all foundries. As a result merchant iron shipments continue to decline. Production of pig iron in the Pittsburgh-Youngstown district was fractionally higher in May than in April, but was one-third less than in May last year.

Iron Ore . . .

Iron Ore Prices, Page 173

Cleveland—Discovery of a new rich iron ore deposit in western Ontario was announced last week by Cyrus S. Eaton, chairman, Steep Rock Mines. The find was made in the Hogarth open pit and is said to analyze 61.5 per cent iron with silica content of 1.5 per cent.

Cleveland—Shipments of iron ore from the head of the lakes are running substantially behind the movement in the 1953 lake shipping season. However, the tonnage shipped in the week ended July 12 was the largest for any week in the 1954 navigation season.

Total moved during the week was 2,683,243 gross tons, reports the Lake Superior Iron Ore Association. This compares with 3,250,489 tons brought down in the like week of the 1953 season.

Cumulative shipments to July 12 this year are reported at 26,420,894 tons, down 14,962,482 tons from cumulative shipments in the 1953 season to the same date.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 173

Washington — Production of coke during May totaled 4,800,761 net tons, reports the Bureau of Mines. Daily output for the month was the lowest since July 1952.

Of total May coke production, 4,772,388 tons were oven coke, and only 28,373 tons beehive.

Production through May this year totaled 25,329,464 tons, of which 24,998,700 tons were oven coke, and 330,764 tons beehive. Cumulative output in the like period last year was 33,299,200 tons, of which 30,716,900 tons were oven coke and 2,582,300 tons beehive.

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QUALIFIED BLAST FURNACE SUPERINTENDENT or Assistant on single stack plant. Give experience, education and salary expected. Write in detail. Reply Box 978, STEEL, Penton Building, Cleveland 13, Ohio.

EXPERIENCED METALLURGIST preferably with experience in Metallurgy and Welding of stainless and corrosion resisting steels and alloys, and in the manufacture of tubing from these materials. CARPENTER STEEL COMPANY, ALLOY TUBE DIVISION, Union, New Jersey, Atten: Personnel Director.

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An alloy and specialty steel company has several openings for well trained aggressive salesmen who while they are presently employed may be looking for opportunities for advancement. Technical education is not absolutely necessary but desirable. Men with good sales records and ability to progress to management positions are required. Write to Box 996, STEEL, Koppers Building, Pittsburgh 19, Pennsylvania.

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HERE IS A CAREER OPPORTUNITY FOR A THOROUGHLY EXPERIENCED TUBING MAN TO HEAD UP THE DEPARTMENT OF A WELL ESTABLISHED PHILADELPHIA WAREHOUSE. MILL OR WAREHOUSE BACKGROUND IN TUBING SALES A MUST. THIS IS THE CHANCE OF A LIFETIME FOR A REAL GOOD MAN. WRITE IN CONFIDENCE TO—G. J. EHNE, HILL-CHASE & CO., INC., TRENTON AVE. & ONTARIO ST., PHILADELPHIA 34, PA.

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SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 44 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 665 Brisbane Bldg., Buffalo 3, N.Y.

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SIZE: 75,000 square feet
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5 barge lines, 17 rail lines, 82 motor freight carriers providing competitive service to all principal cities in America.
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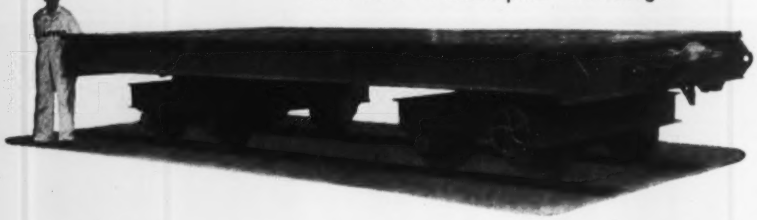

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Specify Sterling No. 119 HEAVY-DUTY CART
Pneumatic-tired wheels or steel wheels

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...if only
for THEIR sakes

... learn how to protect yourself from death from cancer. They need *you!*

And for your sake and theirs you must keep on remembering that the best cancer "insurance" is:

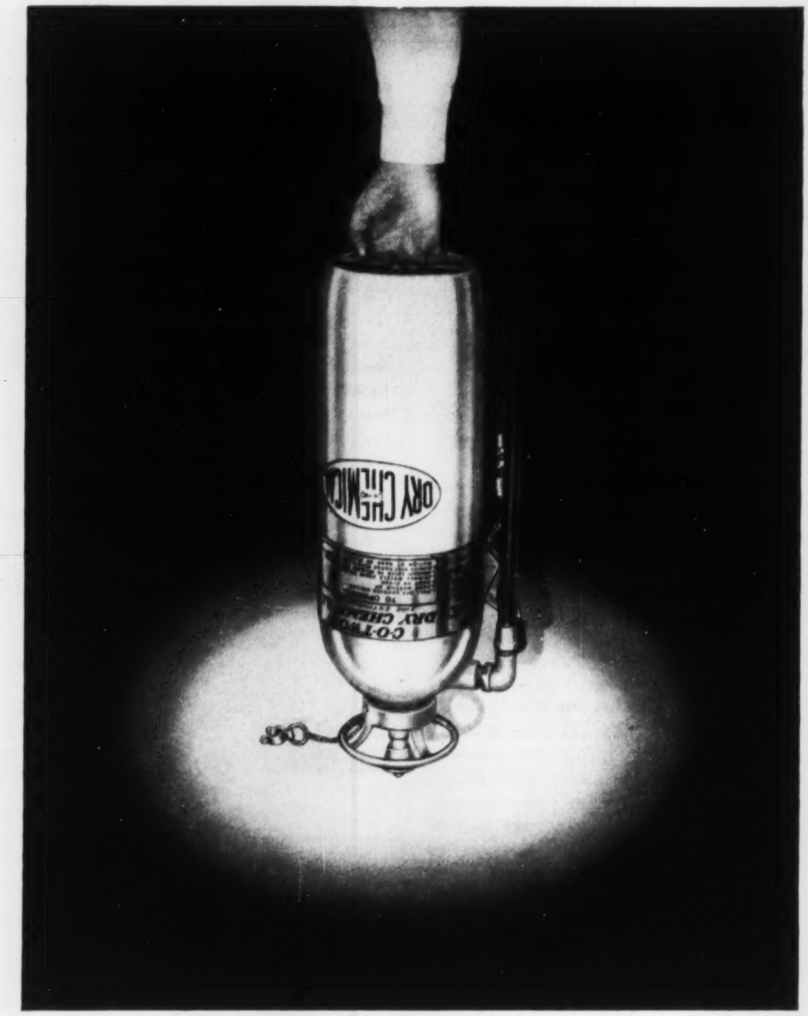
FIRST... *to make a habit of periodic health check-ups no matter how well you may feel, always including a thorough examination of the skin, mouth, lungs and rectum and (for women) the breasts and generative tract.*

SECOND... *to learn the seven danger signals that may mean cancer, and go straight to the doctor at the first sign of any one of them—(1) Any sore that does not heal (2) A lump or thickening, in the breast or elsewhere (3) Unusual bleeding or discharge (4) Any change in a wart or mole (5) Persistent indigestion or difficulty in swallowing (6) Persistent hoarseness or cough (7) Any change in normal bowel habits.*

For other life saving facts about cancer, phone the American Cancer Society office nearest you, or address your letter to "Cancer"—in care of your local Post Office.

American
Cancer
Society

Bump that assures positive results



When fire strikes, seconds count . . . your fire extinguishers must be the right type and function properly from the very start . . . failure means serious losses.

The growing popularity of the highly effective powdered dry chemical fire extinguishing agent may be hampered by a drawback . . . settling or packing can occur after a lapse of time. However, with C-O-TWO Dry Chemical Type Fire Extinguishers there's no chance of this happening.

The exclusive inverting and bumping design of C-O-TWO Dry Chemical Type Fire Extinguishers provides mechanical breakage of the dry chemical by shifting its position in the cylinder. This outstanding mechanical breakage, plus continuous inert gas pressured agitation or fluffing of the skillfully blended free flowing dry chemical, guarantee lasting, foolproof fire protection.

No other brand on the market today gives you this extra margin for positive results. Inverting and bumping is only one of many unique design advantages that make C-O-TWO Dry Chemical Type Fire Extinguishers your best buy for killing flammable liquid and electrical fires, as well as surface fires involving ordinary combustible materials.

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Act now for complete free information on these top quality, sure-acting fire extinguishers. Remember fire doesn't wait . . . get the facts today!

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Squeez-Grip Carbon Dioxide Type Fire Extinguishers
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Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
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Sales and Service in the Principal Cities of United States and Canada

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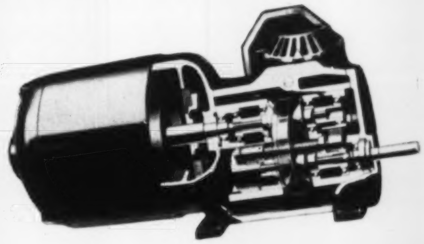


MECHANICAL SPEEDRANGER

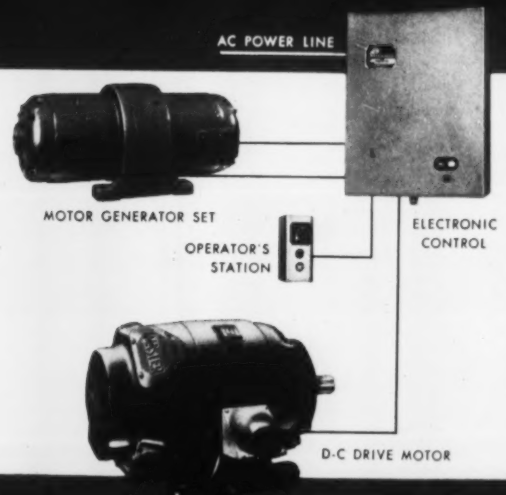
SIZES. ¼ to 5 HP with speed ranges up to 8 to 1.

FEATURES. Long life all-metal construction, very compact unit gives constant torque, infinitely variable speed operation.

ELECTRONIC SPEEDRANGER

SIZES. ⅛ to 15 HP with speed ranges up to 6 to 1.

FEATURES. Constant torque rating, smooth starting, good regulation . . . with jogging, reversing, dynamic braking, and wide speed ranges as optional features.



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THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

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Full line contact between rollers and races is one reason Timken bearings stand up so well on this punishing job. It gives Timken bearings extra load-carrying capacity.

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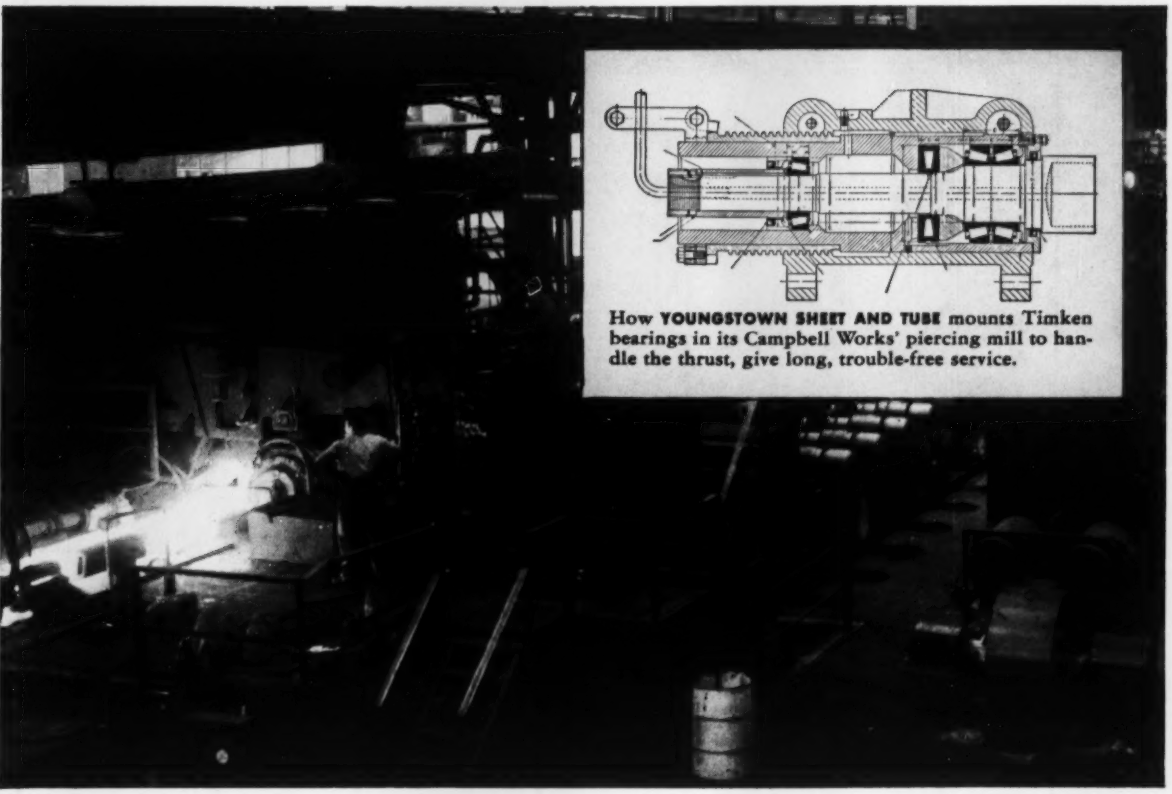
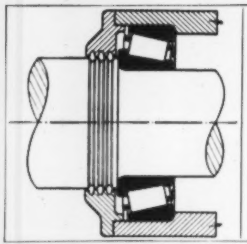
To get these advantages in the equipment you build or buy, always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Canadian plant: St. Thomas, Ontario.

This symbol on a product means its bearings are the best.



How **YOUNGSTOWN SHEET AND TUBE** mounts Timken bearings in its Campbell Works' piercing mill to handle the thrust, give long, trouble-free service.



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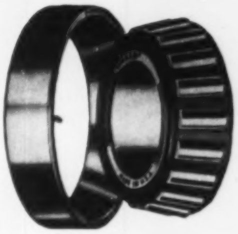

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